

COALAGE

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How About Another Club?

CHRISTMAS and vacation clubs have enabled people of impecunious habits to finance their Christmas giving and their yearly trips to the country. The two kinds of provision for the future balance one another admirably. The banks have Christmas money coming in midsummer when they are meeting the drain of the vacation payments, and vice-versa.

How about coal clubs with payments ranging through the year and maturing when coal can be purchased most cheaply and with the greatest assurance of delivery? It certainly should please the coal operator and afford the consumer cheap and cleaner coal, assured delivery and the least strain on his pocketbook.

After all why not? The cost of coal is greater than that of the Christmas giving and but little less than the high cost of vacationing. More power to the scheme if it can be achieved! Insurance in all forms is popular. Why not insure a full coal bin and avoid winter worry? Even the apartment-house owner and factory manager might favor it. And the banks would be benefitted, for it would smooth out their load curve by making three periods of maturity instead of one or two. It would leave more money in their hands at each period of maturity.

Ready to Your Hand

PLANT publications are expensive, especially if of frequent issuance, and on looking them over one sometimes wonders whether the miners' circulars of the Bureau of Mines would not be a fair substitute for them or at least a valuable supplement to them. One of the leading themes of the plant paper should be safety, and this feature the Bureau of Mines' miners' circulars teach to perfection, better perhaps than an article from the general manager or his superintendents.

In many cases these publications cannot be obtained without charge, the free list being already exhausted, but they can be purchased at a low price from the Superintendent of Documents at Washington.

If, however, the plant publication is provided why not in preparing it draw freely from Bureau of Mines' publications, leaving out parts which might not relate to workings such as yours and giving due credit for the material taken. The Bureau is anxious to have an opportunity like this to do the industry a service.

The work of the Bureau is hampered by inadequate distribution of its pamphlets. It is waiting to aid in safety work if an opportunity only be given. Mining men would seem to have overlooked what an advantage the publication of these elementary monographs confers on them. Mine superintendents and managers should have most of the Bureau's publications—certainly all those relating to safety—and should make it a point to see that all responsible men in the organization

not only receive or purchase them but read them as soon as they are available. They should be seen in every mining man's library.

Get Together Electrically

WITH consolidations of companies the whole question of the efficiency of the private power plant is revived. A group of adjacent mines can build and operate a power plant much more economically than a number of individual mines could maintain one at each opening. The new plant built for them all can be of the most modern type. It is true it will not be able to avail itself of an advantage which each of the others might have taken but usually did not, for it cannot use the refuse coal of all the mines, though it can use the refuse from one or two and so economize where the others failed.

So many economies go with an adequate plant that each new consolidation should be followed by a careful inquiry as to the advantage of manufacturing power at one or more of the mines thus consolidated. The diversity factor of many mines probably will be better than that of any one of the mines in the group. A get-together financially should be followed by a get-together electrically.

An article in this issue shows how a company buying power combined its loads in metering them and saved 19 per cent in its power bill. This shows how having a plant for several mines will smooth out the load curve and make the operation of the power plant for a group of mines more economical.

How Many Sub-Bosses Have You?

ADEQUATE supervision is the secret of success. Neither tonnage nor economy can be obtained without it. Even if every man on the job were keyed up to do his best he could not do it if there were no correlation of effort. Nowhere is a man more helpless than in the mines unless he is given a proper degree of co-operation from the forces outside. But, as men rarely exert their best efforts, still more do they need to be under supervision.

The tracklayers, bratticemen and roadmen can usually make a pretense of energy without achieving anything. There are lots of plausible excuses for idleness—waiting for boards or props, for some one to square a room neck, for water to be removed, for the smoke to drift away, for rock to be loaded, for trips to be pulled, for spikes or rail to arrive. When such men delay their work they hold back other men. Often they have made up their minds to follow a set plan, and a little interference at one place holds up their efforts, when if they would work where opportunity presented they could fill in almost every idle moment. Some men

have an irritability that prevents them from regulating their work to circumstance. So they need to have the guidance of a boss.

Give the mine foreman plenty of help. Put the men holding subordinate positions definitely under the mine foreman, hold him responsible for their work, and he will get results. Men who on the surface would not be permitted to work without supervision are often put to work underground in the dark without a boss. The reason is simple. We all know how men idle when working above ground, but we do not know how often men dilly dally below ground, or how often they go to sleep on an overcast or in a return entry when they ought to be working. We all know how men find excuses for idleness in the open air. There are more excuses in the mine, yet we allow the men who find them to idle on the job without observation. Supervision is not money thrown away, it is money well invested. Many a mine fails to get out cheap coal because all the supervision is left to one mine foreman.

Fear and Fatality

SAFETY MEN, showing us how accidents can happen, are beginning to hedge a little and to question whether the psychology of fear may not produce the very dangers against which they have been warning. It cannot be gainsaid that fear sometimes is a cause of accident. The animal or the man attacked by a savage beast is likely to be palsied by fear and unable to run or even feign death. The man who will walk along a plank laid on the ground without a tremor will quite generally fail entirely to walk that plank if laid between two windows on the fourth story of a building.

An automobilist whose engine stops on a railroad track may fail utterly to use the same judgment that he would summon to his aid if his engine stalled at the side of the curb. Locked in a hotel room by a key which he himself has turned on his own side of the door, a man may fumble and burn to death before he can turn the key if the house catches on fire. Fear masters him. His judgment no longer controls his body.

The same may be true of a miner. His dread of a roof fall may make him unable to run; his fear of death from the afterdamp of an explosion may enfeeble his body and destroy his judgment. In fact the apprehension of death often causes a man to interpose but a feeble resistance to disease when it attacks him.

Perhaps there are dangers against which we may battle best if our minds have not been prepared beforehand to anticipate and dread them. It may be that in regard to some accidents the less we dwell on them the better we shall meet them when they confront us. We need regarding these to think less about the result and more about prevention, lest when they confront us we may be enfeebled to combat them rather than instructed how to avoid them. Our instinct then may serve us better than education.

But fear, if not too abject, often is our best counselor to safe action. Many of us, in strange circumstances, would be disposed to take risks if not duly counselled by discomfiting anticipations, and in a campaign against accident we would do well to remember that there is a safe and unsafe measure of fear. There are premonitions which spur us to caution. There are fears which unnerve. The passenger on a boat in a stormy sea often is made helpless whereas the seaman on that same boat is moved only to take further precautions. He even accepts certain risks that

he may avoid greater dangers to himself and his associates.

In the safety campaign grawsome posters frequently are undesirable because they stress danger rather than precaution. They may cause more harm than they cure. They may help some men, and they may harm others. Our reactions are quite dissimilar, and the poster that will serve with some a useful purpose may not be uniformly helpful. It is sometimes a matter of balance whether a poster or other warning will, in the main, be helpful or harmful. Timorous persons may be merely scared by them. Bolder men may be counselled to take measures of prevention. Still more fearless men may take them as a "dare" and as an opportunity to obtain a thrill that appeals to their adventurous souls.

However, men exposed to dangers cannot well avoid realizing the results of accident, and consequently perhaps our grawsome posters will not scare them at all. But if posters do not make men think, they serve no purpose whatever. Consequently it would seem better to use posters that deal with preventive methods rather than with terrifying outcomes, though there are eventualities of a more remote character that we can portray such as poverty in the home, widowhood and orphanhood that do not introduce the fear complex.

Right to be Heard

AFTER years of neglect, electrical engineers are being asked to give their views as to power savings. Time was when the big boss refused to listen to them, and they learned to be silent and discreet. When they pleaded their case it was met with a shrug of the shoulders and other visible signs of impatience, but the external pressure of power bills has brought even the big boss to a realization that the right kind of electrical engineer can be of considerable assistance in lowering his costs.

Many are the ways in which electrical engineers can save money for their companies, and successful is that electrical expert who is ready with suggestions when they are sought. The superintendent who does not listen is slated for replacement. If he adapts himself to the suggestions of the electrical engineer he will better his standing with the company for there is much that the electrical engineer can tell him as to economy. He can lower his line losses by the use of substations near the load, by providing adequate conductors and by better bonding. The same provisions will assure him of more adequate power for operation, decreased depreciation of equipment and fewer burnouts.

By the introduction of automatic substations he can reduce labor costs. By distributing loads he can cut down his power cost and he can avoid the purchase of much unnecessary machinery for his generating station, should he have one. By correcting his power factor if he uses alternating current he can increase the carrying capacity of his conductors without a heavy bill for copper. By the same means also he can make better use of the power he is generating or purchasing. By better bits he can lessen his cutting costs and avoid burnouts and deterioration.

Consequently it will pay him to have his electrical engineer at the Huntington meeting of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers where he can get in touch with new developments, most of which relate to power saving.

Rock Dust No Cure-All, Say Western Engineers

Coal Fields That Introduced Dusting in America in 1911
 Today Consider Water Also Essential—High-
 Pressure Dusting Wins Favor—Mud-
 Spraying Experiments Progressing



BY E. W. DAVIDSON AND ALPHONSE F. BROSKY
 Editorial Staff, *Coal Age*

ROKE DUSTING is no cure-all for the explosive ills of coal mining. It is necessary in most mines, but no mine can be rendered safe against the explosibility of coal dust by the use of pulverized rock alone. Water, judiciously and persistently applied is just as necessary.

This is the conclusion of the West—the coal mining region in which rock dusting was introduced to America. The West ambitiously is dusting today, in an effort to live up to the expectations that every mine in the mountains be dusted before winter. Fifty miles of entry are already dusted. The West is distributing dust by traveling blowers in large volume at low pressure and in small volume at high pressure. It is discharging dust into intake airways. It is spreading dry adobe by hand and by machine and is getting several distributions from each application by stirring up the floor layer occasionally. It is using ground limestone, leucite,* gypsum and shale. It is spraying dust in the form of mud. It is trying literally every method of "dusting" known—and some that are unknown. And in addition to that it is using water liberally in regions where water is available.

There have been many object lessons in the Rockies during the past three years of the horrible loss and suffering caused in mines that are not dusted. Furthermore, in September there was an object lesson offered by the Rains mine of the Carbon Fuel Co. in which an explosion killed five men but was markedly reduced in force and finally checked entirely by rock-dust areas.

In view of all this experience, the West may know what it is talking about when it says rock dust is no cure-all, but that dust and water together come near attaining that distinction. Its judgment is based on practice.

There really is little that is novel in 1924 about the dust blower and the dust trough barrier now used in a handful of mines in southern Illinois, in one mine of western Kentucky and in a scattered few in West Virginia and Pennsylvania. Both were used in Colorado

in 1911, and Wyoming saw some dusting in that same year.

The earliest protective dusting in this country was at the Delagua mine of the Victor American Fuel Co., in southern Colorado. That company was inspired by rock-dusting experiments in England. Capt. Jack Smith, safety engineer for the Union Pacific Coal Co. at Rock Springs, Wyo., recounts that "an English operator at Altofts, Eng., as early as 1906 noticed that natural shale or inert dust checked the propagation of an explosion in his colliery."

The dusting at Delagua began in 1911 soon after a series of coal dust explosions including one at that mine. Such men as W. J. Murray, then general manager of the company and B. W. Snodgrass, then boss of Delagua, but now general superintendent, decided that adobe dust from the countryside was sufficiently inert to be used in the place of rock dust and certainly was fine enough when thoroughly dried by the sun. So they sent men out on the wagon roads in dry periods to haul large volumes of the road dust into protected storage.†

The first application of dust in the mine was made by men who carried dust in large buckets and threw it on the roof, ribs and timbers with small domestic coal shovels. The dust was thrown against the ribs, etc., with enough force to dislodge the accumulated coal dust and replace it with adobe dust. In that manner the timbers, small ledges, crevices, and other lodging places for dust were loaded up to the angle of repose with inert dust, leaving less room for the lodgment of coal dust.

Then along the same roads, shelves were placed one above the other on the ribs by drilling holes in the coal in which pegs were driven which supported the shelving. These shelves were loaded with as much adobe dust as would stay on them. At all points where height would permit, shelves were suspended to timbers with wire and loaded up with adobe dust; and at points where the roof was unusually high, V-shaped troughs filled with adobe dust were set at right angles to the entry on timbers and supported so that they could easily be overturned.

While this application was being made, a blower was constructed to blow adobe dust into suspension. Sev-

*Way back in 1911 the machine illustrated in the headpiece was built and put into operation at the Delagua mine of the Victor-American Fuel Co. in southern Colorado. The idea came to B. W. Snodgrass, now general superintendent for the company, from England, where dusting was evolved experimentally in 1906. This machine blew adobe dust through the Delagua mine for three or four years. The dust was not ground, but merely shoveled up from the roads in dry weather and stored under cover.

†Leucite is a rock-forming mineral composed of potassium and aluminum metasilicate.

See "Prevention of Coal Dust Explosions," Vol. 2, p. 756, Nov. 3, 1912, and "The Explosion at Ravenswood," Vol. 5, p. 411, Mar. 7, 1914, in *Coal Age*. Both articles are by Samuel Dean.

eral types of blowers were constructed before one of practical value was perfected. The practice was to load up the hopper of this blower; then load two pit cars with adobe dust in sacks and send this train into the mine propelled by an electric locomotive. Two men went with it—one to operate the locomotive and the other to operate the blower. This blower was put in operation and hauled by the locomotive against the air current until all the dust had been blown away. The dust was blown against the ribs and roof where some of it naturally lodged immediately; some was carried long distances by the air current and, of course, much of it found lodgment on the floor.

A film of coal dust would accumulate on top of the adobe dust, especially on the shelves and timbers, and men were sent along the roads periodically to scrape off that film of coal dust and to pile on more adobe dust.

They found that by short circuiting the air on certain cross entries where the locomotive could not go, the air current would carry the adobe dust long distances and deposit a film of it on the roof, ribs and floor of rooms as well as the entries.

The Delagua mine was dusted with adobe systemati-

mines in Wyoming, now the property of the Union Pacific Coal Co. Superintendent Redshaw, in charge at the time, had the dust spread thickly on all entries so that it would mix with coal dust under the disturbance of travel. This was done because the extreme dryness of the region made sprinkling practically out of the question. Water for domestic purposes had to be hauled to Winton in tank cars. Although that was more than six years ago much of the original adobe dust is still noticeable along the ribs of the entries.

A chronology of early dusting in this country would record the next use of "rock dust" in the Allison No. 1 mine on the Monongahela River in Pennsylvania. According to H. I. Smith, chief mining supervisor for the U. S. Bureau of Mines, a few miners in 1914, on their own initiative began an interesting practice.

In front of each face to be shot they placed two carpenters' horses or other supports approximately 30 in. high. On these they rested a wide plank or platform heaped high with fine motor sand. The force of the shot blew this loose sand back toward the room neck and disseminated it freely but did not mix it with the coal to be loaded out. A charge of motor sand thus



Reliance Mine

One of the first to use adobe dust in America. It was dusted in 1911 and, even today though twelve years have elapsed, there is evidence in the manway of the mine of that early rock dusting.

cally and effectively until 1918 when the large supply of dust which had been stored in the previous year had been exhausted. After that the company relied upon sprinkling with water for protection against the coal-dust hazard. Now, however, systematic dusting has been readopted at the Delagua mine, and a dust-grinding plant is being installed. A new blower is in process of development.

In 1911, soon after dusting began at Delagua, the Reliance mine at Rock Springs, Wyo., then in process of construction, was dusted with adobe. George B. Pryde, vice-president and general manager of the Union Pacific Coal Co., says of this pioneering:

"When the slope, air course and manway had reached a distance of about 1,000 ft., adobe dust was scattered in the manway for a distance of about 600 ft. to a depth of about 8 in., it being the idea that as men and animals walked into the mine they would pick up this dry adobe dust and it would be carried in along the entry and deposited on the ribs."

"After a period of twelve years some of this adobe still remains in the manway. The ribs of the manway are heavily coated with this dust, and adobe is still noticeable along the ribs of some of the entries. This first attempt at rock dusting by The Union Pacific Coal Co. was inexpensive and fulfilled expectations."

Though dusting was discontinued at Reliance at about the entrance of the United States into the World War in 1917, another job of rock dusting was done in that same year when the Megeath Coal Co. made one general distribution of adobe dust through the Winton

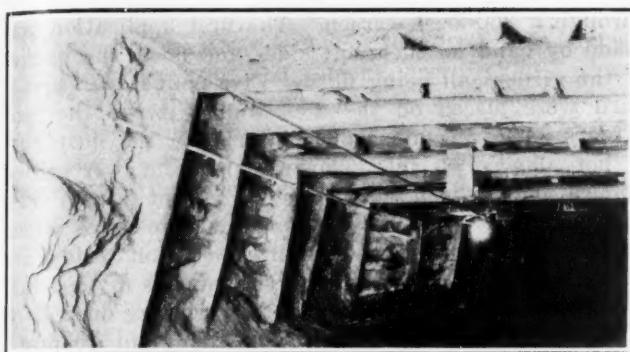
was distributed with each 6-ft. advance in the territory worked by these men. The practice was continued for a year or so.

The next year—1915—the Pittsburgh Coal Co. experimentally dusted 2,000 ft. of entry in one of its mines with pulverized limestone but this proved to be merely a sporadic effort.

Soon after this exhaustive experiments in the use of finely divided shale began at the mines of the Old Ben Coal Corporation in southern Illinois. There, the greater part of the intensive development of dusting that has been carried on by coal companies was made. But not a single mine in southern Illinois followed the lead of J. E. Jones, Old Ben safety engineer, until a little over a year ago when the Burlington railroad, at its Valier mine nearby began intensive dusting along the lines laid down by Jones and the U. S. Bureau of Mines. Recently, the Chicago, Wilmington & Franklin Coal Co. has borrowed the Old Ben distributor and has dusted parts of its Orient mines, and one or two other large Illinois companies declare they will dust as soon as they find an efficient distributing unit. But the number is few.

The West Kentucky Coal Co., with twenty-two mines in its end of the state, has just installed an impact pulverizer and is crushing shale taken from above the No. 12 seam of coal. The company is dusting entries but not rooms in one of its mines, using V-trough barriers in all aircourses just outside the live workings.

A distributor has been built, under the eye of T. E. Jenkins, operating vice-president. It is a steel hopper



Cement Mortar Smooths Away Dust Lodgments

This main entry in Mine No. 6 of the Phelps Dodge Corporation has the ribs, roof and timbers treated with mortar by the cement gun. Although coal dust can accumulate it is given greatly reduced opportunity for lodgment when the angles are rounded by a cement mortar coat.

car with a screw feed driven through a speed reducer by a belt from the shaft which operates a blower. A 5-hp. motor supplies power. The stream of rock dust is directed by a man seated on the rear end of the car who handles a canvas discharge hose.

In the east the Indianola mine of the Inland Collieries Co., a short distance from Pittsburgh, under its general manager, T. G. Fear, was probably the first mine to adopt the practice of rock dusting on a large scale. It has completely dusted all the entries in the mine, which is a large one producing 3,000 to 3,500 tons per day. All the dust laid in this mine has been purchased, but a pulverizing plant having a capacity of about one ton per hour is in process of construction.

Several years ago, long before any notice was given generally to the merits of rock dusting, William Hulings, superintendent of the Gallatin mine of the Pittsburgh Coal Co., experimented with a rock-dust distributor. Evidence of the work of this machine was seen on the ribs along a stretch of entry in the Gallatin mine until it was covered by a more recent application of rock dust.

The Pittsburgh Coal Co. is working energetically in the rock dusting of its mines, all of which eventually are to be treated. About 10 carloads of rock dust have been shipped to this company, more than half of it already has been applied. Six of its mines have this work in various stages of completion, and rock dusting was started recently in the seventh, the Mansfield mine. Prepared limestone dust is being used. The company has been working on several types of distributing cars. One type which will likely be adopted as standard is equipped with a stationary nozzle. Mining men inside and outside the company are highly impressed with the machine. The company has gone a step farther than any other, to our knowledge, by building a special locomotive for rock dusting purposes, possessing the proper speed characteristics and other details best-suited to the needs of this work.

All the haulage roads (13 miles) in the comparatively newly developed Harmarville mine of the Consumers Mining Co., near Pittsburgh, have been covered with prepared limestone dust, applied by a distributor which this company has been developing. The dusting of aircourses is next on the company's program in this mine, and this work has been started.

In the Coverdale mine of the Pittsburgh Terminal Coal Co. rock dusting has become one of the standard mining practices. About six miles of haulage roads have been dusted by machine thus far; twelve miles of

haulage road and all the aircourses remain to be dusted. Prepared limestone dust, some coming from Ohio and some from Michigan, with 80 per cent fine enough to pass a 200-mesh screen is being used. In this mine a study of methods is being made by Research Fellow C. H. Dodge of the U. S. Bureau of Mines and the Carnegie Institute of Technology. This fellowship was instituted and financed early this year by the generous aid of interested parties.

The Hillman Coal & Coke Co. is laying prepared limestone dust by machine in two of its mines and will follow out a similar program in them all. One of the two mines of the Republic Collieries Co. at Russellton, Pa., is being dusted; the other is closed down. The Ontario Gas Coal Co. and the Lincoln Gas Coal Co. have just started in this work. The Springdale mine of the West Penn Power Co. is being rock dusted, and plans are being laid for this same treatment of the coal dust in its Beech Bottom mine in West Virginia.

In Washington County the Langeloth Coal Co. is preparing to rock dust. The Vesta Coal Co., the National Mining Co. and the Bethlehem Mines Corporation are investigating methods of rock dusting and the equipment required. Westmoreland County is represented by the Westmoreland Coal Co., which has been laying prepared limestone dust by a machine of its own make and by hand.

In Fayette County, where the need for rock dusting is about as great as in any locality in the country, little activity is noticeable. The Oliver & Snyder Steel Co. is one of the few companies in this county that are distributing rock dust. In Greene County the Nemanolin mine of the Buckeye Coal Co. and the Mather mine of Pickands-Mather & Co. have done much dusting by hand. They will use machines in the near future.

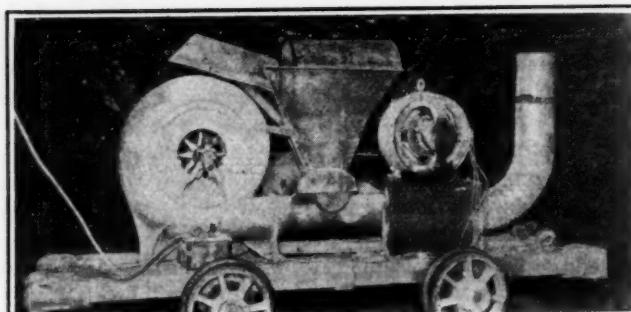
Only three companies, we believe, are rock dusting in Cambria County. One of these is the Berwind-White Coal Mining Co. which has developed a machine and is now engaged in rock dusting two of its mines; another is Peale, Peacock & Kerr, Inc., which also is installing a pulverizing plant, and the third is the Penelec Coal Corporation which has started to rock dust its five mines. The Pennsylvania Coal Corporation has been rock-dusting some of its mines by hand, but the work is still in an experimental stage. The company is disposed to favor the use of rock dust barriers.

As for the other eastern states, little can be said except that they are surprisingly slow in taking advantage of the merits of rock dusting. Ohio operators apparently have given this matter no consideration.



Mill Tailings Applied by Cement Gun

Ribs and roof are partly coated with mill tailings applied with the cement gun and partly uncoated. The difference between the two can be clearly seen.



Rock Dusting Machine at Old Ben

This machine at the Old Ben Coal Corporation's plant, West Frankfort, Ill., has done such good work in Old Ben that it recently has been sent to the Chicago, Wilmington & Franklin Co. to do an equally beneficent work in its mines.

West Virginia is slow, particularly the non-union fields. The Consolidation Coal Co. is said to be developing rock-dusting equipment. It and one or two others save the state of West Virginia from being listed with Ohio. Robert Lambie, chief of the department of mines of West Virginia will probably present for enactment new laws before the next state legislature compelling rock dusting of all mines in this state.

Kentucky also is backward. The West Kentucky Coal Co., however, is installing a pulverizer and is rock dusting. Few other mines are following its footsteps. Neither Virginia nor Maryland have displayed active interest in the undertaking. Tennessee is doing little rock dusting. In Alabama many of the companies so far appear content to spend as much as 10c. per ton for wetting down coal dust (if this is possible) rather than save by rock dusting about 9c. of that cost. However, not all the Alabama mine owners have overlooked rock dusting. The Sloss-Sheffield Steel & Iron Co. is going into the work in a big way. It is installing a pulverizing plant. The Gulf States Steel Co. and the De Bardeleben Coal Corporation are beginning to rock dust and the Tennessee Coal, Iron & R.R. Co. has made designs for a rock-dusting car.

Limestone is being used almost universally in the East. The mine owners do not consider the use of any dark-colored rock dust good practice. They have discovered that powdered limestone dust is almost white and therefore reflects light much more efficiently and affords better illumination than gray shale dust.

Frank Haas, consulting engineer of the Consolidation Coal Co., suggests an investigation of the merits of the hydrous silicate of magnesium, steatite, more commonly known as soapstone or talc. In some deposits this rock is only one-third to one-half as hard as limestone and possesses approximately the same specific gravity. It is also extremely white. Extensive deposits are found in New York and in many coal-producing states. At present it is used chiefly in the manufacture of paper and composition roofing.

Many rock-dust distributors are being developed in the eastern mines but few have reached such a stage of operation as would warrant their being termed entirely successful.

As far as Canada is concerned we hear that rock dusting has been commenced by the Dominion Coal Co., and so far is confined to the main electric trolley road in No. 1B mine. The roof of the roadway is supported on steel girders and lined with concrete to prevent spalling. The road which is ballasted with slag is two miles long. The dusting has been done with powdered dolomite rock, 80 per cent of which will pass

through a 200-mesh screen. The first application was made by hand on the roof, sides and floor, the flanges of the girders all being filled. Five pounds per square yard were placed on the floor and 3 lb. on the roof girders. The incombustible material in the floor dust is not allowed to fall below 75 per cent. A second application has been made with the cement gun on sides and roof and on the floor except at crossings which are hand-dusted. Shelves containing one ton of dust are placed at 600-ft. intervals, and the mine is divided into panels, the entrances and exits of which are dusted for 400 ft. in the same manner as the main roadway. Compressed-air power is used in the workings exclusively.

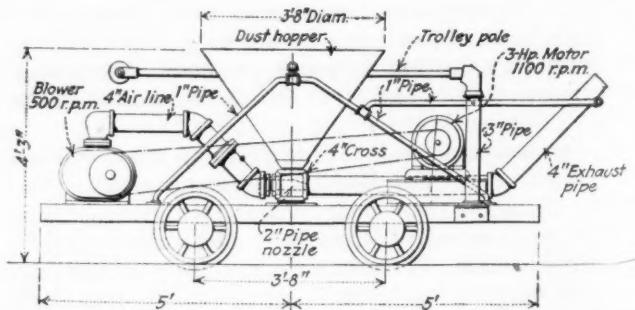
These Midwest and Eastern dusting enterprises, no matter how efficiently performed, do not convince the Western mining engineer of their efficacy where the mines are dry. It is the excessive dryness of the high altitudes which moves him to say that dusting alone is not sufficient protection against coal-dust dangers. Western engineers believe, with Dan Harrington, once a Bureau of Mines' engineer but now a consulting engineer in Salt Lake City, that precautions must be taken at the face to prevent the formation of coal dust and its dissemination by air currents.

"If we don't have that," declares Harrington, "the rock-dusted mines of this country are liable to suffer some severe jolts in the future, just as our sprinkled mines have been jolted in the past, due to slipshod methods and overconfidence in the efficacy of water."

The West has had some coal dust lessons that are still fresh in mind. It knows that dust on an intake airway which started a fearful explosion less than two years ago was 65 per cent inert—a percentage that rock-dust authorities generally consider will make the coal dust innocuous. This dust bred the explosion partly because it was extremely dry—2 per cent moisture by analysis—and because of its fineness. A large percentage of a sample taken at the point of the blast's inception passed through a 325-mesh screen. Dust such as this, which was mostly air settling on timber caps and the like, was borne there by the air stream because it was not rendered harmless at the faces.

In western mines to make the dust moist is an important part of the program. The best examples of this effort are at the Stag Canyon mines of the Phelps Dodge Corporation, Dawson, N. M., but in several other Utah mines consistent sprinkling is required.

The usual practice is to lay 3-in. water lines in all main entries. In panel entries 1½-in. pipe lines carry water to points within 100 ft. of the faces. In rooms



Earliest Dust Blower Design Not Unlike Models of Today

This device, which was built in 1911 at the Delagua mine in Colorado consisted of a steel hopper to carry the dry adobe dust and a 3-hp. blower to force a stream of air through a pipe receiving the dust by gravity from the bin. A locomotive, two cars of dust in bags and this blower car comprised the trip which introduced the practice of dusting into the coal mines of this country.

4-in. lines are maintained 20 or 30 ft. from the faces. On all entries hose connections are provided every 100 ft. for periodic sprinkling by hand and at room faces where the greatest emphasis is placed upon sprinkling, every loaded car is to be sprinkled by hose and each mining-machine cutterbar is equipped with a 4-in. pipe, reduced at the end and bent down pointing directly on the chain, to saturate every ounce of bug dust that is made. These provisions with sprays for all loaded trips at main partings and various systems of atomizers and exhaust steam nozzles on intake entries are now being put in operation by western companies who regard them as important adjuncts to the distribution of inert matter through the mines.

In the practice of dusting, adobe has been lavishly used in most Rocky Mountain mines, especially those of the southern districts where that sort of dirt is obtainable almost anywhere around the mouth of the mine by the simple process of shoveling it into mine cars. It is spread through entries by hand shovel. Later it is stirred up by occasionally dragging the top of a pine tree through the roadways behind a trip. The extreme fineness and lightness of adobe dust when it is dry causes it to be easily stirred up and transported long distances in the air. One man for every 6,000 ft. of entry can keep this adobe raked loose and the coarse coal cleaned out of it. When the proportion of coal to adobe becomes dangerously high, the roadways are cleaned to a depth of 4 or 5 in. and a new application is made.

In dusting main return aircourses all loose coal and rock is loaded out, the ribs and roof being washed down several times. Every 500 or 600 ft. the stoppings between the main and return entries are broken through, and small doors are installed. Blowers are used to force the fine dust into the return aircourses through these openings. Thus suspended the dust travels a long distance before it is deposited on the floor, ribs, and roof. The material used is chiefly adobe, sun-dried and screened on the outside of the mine. A two-ton car load of this dust will cover several hundred feet of airway as little loss occurs, the deposit being from 2 to 6 lb. per running foot of entry.

Blowers are used to force the dust into the main returns. One unit consists of a small blower mounted on a truck with a 2-hp. motor. A 6-in. pipe is attached to the blower and runs the full length of the truck with a projection over the end. A hopper is built over the pipe and connected. Stove pipe or canvas tubing is led from the pipe through the door in the stopping so that the dust is discharged into the return air current.

But adobe is not commonly used in the Colorado, Utah and Wyoming mines which are now industriously dusting. There, the tendency this fall is to swing from surface dust to finely pulverized limestone. A number of pulverizing plants are now installed and more are in prospect.

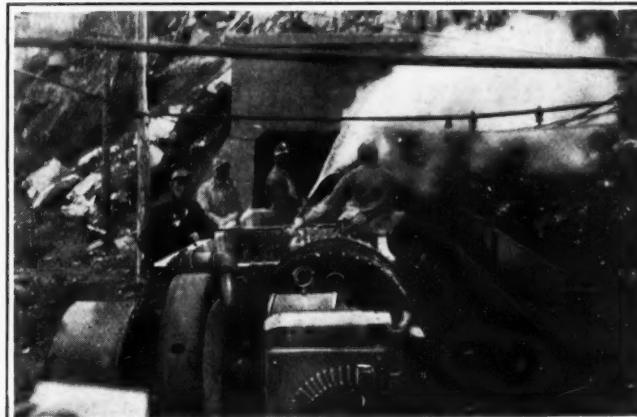
The consensus is that dust coarser than 200-mesh is practically worthless and that a large proportion of it should be of 300-mesh. The 1924 report of the Rocky Mountain Coal Mining Institute's safety committee specified that rock dust "should be 100-mesh or finer." Since it was written, the western mining fraternity has come to put more and more emphasis on the "finer."

Though trough barriers have been installed in several Rocky Mountain mines, usually in batteries of six or more at all panel entries and at the bottoms of

slopes where the supposition is that they will be dumped by runaway trips, the main dependence is placed upon preventing explosions rather than upon stopping them. For more than a year intensive effort has been made to develop portable dust blowers of one type or another, each equipped with a fan distributing dust that is fed into the air stream from some sort of a hopper.

The tendency this fall, however, is to desert low-pressure dusting for that done by higher pressures. Such companies as the United States Fuel Co. and the Utah Fuel Co., both in Utah, and the Phelps Dodge Corporation in New Mexico, are introducing air-compressor units to provide air for blowers. With high-pressure air, a smaller quantity of dust will serve—usually less than 3 lb. per lineal foot of entry—and the fine coal dust on roof and ribs is more effectually dislodged. William Littlejohn, general superintendent of the Utah Fuel Co., feels that in the Castlegate and Sunnyside, Utah, mines of his company, the waste of pulverized limestone is reduced to a minimum by this process. Labor costs of dusting also are reduced.

Wet "dusting," which was developed in the Rockies,



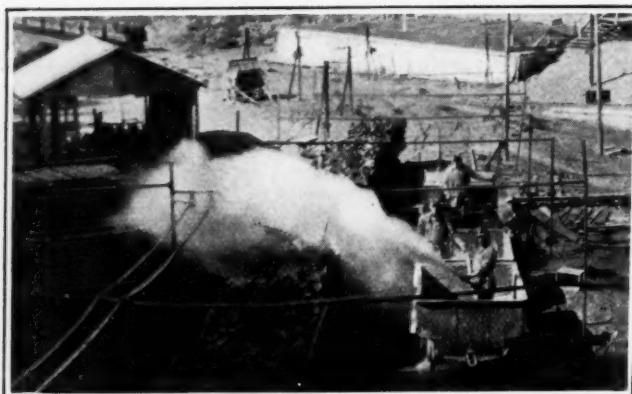
High-Pressure Rock Dusting at Hiawatha

Machine being operated by the United States Fuel Co., of Utah. This machine was devised because of the belief that low-pressure application of rock dust is more expensive and less efficacious than application under high pressure. The force of the stream is sufficient to make much rock dust stick to the dusted surfaces.

is making progress too, thus combining in one process the westerners' double confidence in water and inert dust. "Muditing," which started in the Phelps Dodge mines by the use of a cement-projecting machine and which was advanced at Wattis, Utah, by W. J. Reid, superintendent for the Lion Coal Co., who greatly cheapened the process with a new sprayer of his own invention, is getting wider attention.

The Reid mud sprayer, which succeeds in filling every crack and crevice in roof, ribs and floor, and which washes down coal dust to the floor and agglomerates fine coal with the mud, has been viewed by most of the coal-mining people of the West. The general conclusion thus far drawn by them is that the scheme is a decided success for dry mines and that an occasional coating of mud is good for any mine as it seals up dust-catching holes and cracks and rounds off projections where coal dust might settle.

Mr. Reid set out last September to prove the efficacy of mud by experiments in a 50-ft. length of corrugated iron pipe. This did not prove practicable. Today exhaustive experiments are progressing in an entry 5 ft. wide, 7 ft. high and 250 ft. long that has been driven from the outcrop into a seam of coal about 50 ft.



Another View of the Hiawatha Rock-Dusting Trip

A portable compressor is mounted on a mine-car truck, an injecting device is installed as in the use of a sand blast, and two cars of fine dust are taken along. The outfit then is drawn through the mine against the air, and three-men—motorman, nozzleman and assistant—do the mine dusting with reasonably high speed.

below the seams in which the Lion Coal Co. is working at Wattis.

The intention is to sprinkle roof, walls and floor with water and place 1 lb. of coal dust per lineal foot throughout the whole length to determine the explosibility of Wattis coal dust. Then the entry will be reloaded with coal dust and given one coating of mud. If this explodes, two coatings of mud will be applied and the test run again. Mr. Reid does not believe the first coating will permit an explosion but if it fails to do its job, and if two coats fail, then he will install rock-dust barriers along with mud applications, and so on until he knows positively what protection his mud-spraying method will give.

Some scheme of spraying mud may soon be adopted by many mountain mines on main entries in order to give such passages a non-combustible coating similar to that provided by cement but much cheaper. This, with the lavish use of water at and near working faces, and with dry dust blown through side entries and rooms at high pressure, is the combination of protective systems which the West is adopting swiftly and which has developed out of the long years of study the West has given the subject.

Engineers Hear How Coal Firm Entered Power Business

Electrical Engineers of Lehigh Section Hold Big Session and Discuss Power and Load-Factor Betterment

HOW a coal company formed the largest public utility electric plant in the northeastern part of Pennsylvania and one that uses more anthracite than any other plant in the world, was the dramatic story of G. M. Kennedy, electrical engineer, Lehigh Coal & Navigation Co., at a meeting of the Lehigh Valley Section of the American Institute of Electrical Engineers held Nov. 21 in the Schuylkill County Country Club, near Pottsville, Pa.

Never in the history of the anthracite region has such a large and representative group of electrical engineers gathered together. Nearly 300 were present, some being coal-company officials and others representatives of public-utilities.

The main feature of the evening was the address by G. M. Kennedy. He told the early pioneering history of an electric light and power company which, fostered by his corporation, has now a leading part among such institutions. Early in 1905 the Lehigh Coal & Navigation Co. installed a plant to operate lights and a few mining machines and to supply energy to towns near Lansford for light and electric-railway systems. By 1910 the plant was inadequate, so large had become the demands for power. Consequently plans were laid for the Hauto plant.

Though the Pennsylvania Power & Light Co., the present owners of the plant, have a general load, about 60 per cent of the total demand is for mining. The load curve of the power company is so largely influenced by the demands of the coal companies it serves that it shows all the characteristics of the load curve of an anthracite mining plant. Between 10 and 11 o'clock in the morning the load is heaviest. During the night the load is nearly uniform, due mainly to the pumps, slight variations being introduced by the use of the power for street and residence lighting in the various towns served by the company.

Much about electric transmission and power use was

learned during the pioneer work of the coal company. When old equipment had to be replaced, electricity was given an opportunity, and it soon proved that it had many advantages. Even the manufacturers learned much while this process was in operation. The electric loads soon became so large that the rupturing capacity of switches came to have a real meaning. When switches failed under less than their rated rupturing capacity, manufacturers were compelled to make further researches and better their designs.

"Power-factor correction has become a real problem," said Mr. Kennedy, "but it is a regrettable fact that the power companies have attacked it in an unsatisfactory manner. The penalty clause in the power schedule should be eliminated. When a power company approaches a customer with a penalty clause in its contract, it appears to be carrying a chip on its shoulder. The power purchaser feels it is seeking trouble."

But because power-factor correction is a vital matter we must not overlook the importance of the regulation of the load. Also, much can be done by coal companies to better their load factors. At one mine of the Lehigh Coal & Navigation Co. by careful adjustment the load factor was increased from 34 to 51 per cent.

Conditions at no two mines are alike but the accompanying figures showing the quantities of energy used for the various operations at some of the Lehigh Coal & Navigation Co.'s mines are interesting.

Energy Requirements, Lehigh Coal & Navigation Co.

Use	Kw.-hr. per Ton
Locomotive haulage	1.5 to 3.3
Ventilation	1.5 to 4.5
Pumping	2.0 to 8.5
Hoisting	1.0 to 1.5
Breaker	3.2 to 6.0

The new Coaldale breaker of the Lehigh Coal & Navigation Co. requires about 241,000 kw.-hr. per month. Usually about 10,000 kw.-hr. of electrical energy are required per month for lighting.

Other speakers at the meeting were M. G. Reinicker, superintendent of operation of the Pennsylvania Power & Light Co. and C. M. Gassaway of the East Penn Electric Co. Both of these men spoke of their work in its relation to the generation and distribution of energy to coal-mining companies. W. H. Lesser, electrical and mechanical engineer, presided at the meeting.



Stripping Electrically

Stripping a Twice-Worked Anthracite Basin

Modern Machinery Makes Total Recovery Possible—Surface Removed from Old Mine Workings—Giant Electric Shovel Used—Ward-Leonard Control Employed—Automatic Dump Cars Make Quick Work of Spoil Disposal

BY FRANK H. KNEELAND
Associate Editor, *Coal Age*, New York, N. Y.

IN MANY localities throughout the anthracite region may be found coal properties that were considered as being worked out long ago and were accordingly abandoned. With the lapse of years not only have improved methods and means of working been devised but the value of the product has been greatly enhanced. As a result, many properties that were formerly worked by underground methods are now being reopened by stripping.

Such an operation is that the Cranberry Creek Coal Co. in the Crystal Ridge basin of the Mammoth coal bed, near Hazleton, Pa. This stripping eventually will be 2,700 ft. long and about 500 ft. wide. The maximum depth to the top of the coal or the greatest thickness of cover to be removed will be approximately 165 ft., and the minimum thickness of cover will be 95 ft. The total volume of overburden to be removed will aggregate about 4,000,000 cu.yd. Approximately 90 per cent of this spoil will consist of hard standstone and fine conglomerate and the rest will be made up of surface soil, clay and drift. It is estimated that it will require five years to remove the overburden and extract the coal.

Prior to 1911 both outcrops of this basin were stripped to a depth of approximately 40 ft. The bed now being uncovered is about 25 ft. thick, and pitches at a maximum inclination of about 45 deg. It received

its "first mining" long ago. Much coal, however, yet remains in the old pillars as well as in the tops of the old rooms or breasts.

In order to strip this coal efficiently new equipment of modern type has been purchased. This consists of a huge electric shovel, three 40-ton saddle-tank steam locomotives, seven 30-cu.yd. automatic air-dump steel cars and five 6-in. electric well drills. These latter machines are employed in putting down shotholes by means of which the cover is blasted loose so that the shovel may handle it. Even after this preparatory blasting, however, the stripper has to do the hardest kind of digging.

ELECTRIC STRIPPER IS A VERITABLE GIANT

Interest in this stripping centers in the big Bucyrus, full-revolving, electric shovel employed. This is one of the largest machines of its kind yet built and the first electric coal stripper to be employed in the anthracite region. Some of the more important dimensions of this shovel are as follows: Capacity of dipper (struck measure), 6 cu.yd., (heaped measure), 7½ cu.yd.; length of boom (lower end to center of hoisting sheave), 85 ft.; length of dipper handle, 58 ft.; maximum height of dump above rail (boom at 45 deg.) 65 ft.; approximate working weight, 760,000 lb.; dumping radius at maximum dumping height, 94½ ft.; maximum dumping radius (dumping height 48 ft.), 97½ ft.; radius of cut (at 40-deg. elevation of lip), 101½ ft.; radius of cut at bottom of pit, 59 ft.; radius of rear end of revolving frame from pivotal center,

"Do it electrically" is a slogan that has recently been applied to coal stripping as may be seen in the headpiece. The giant shovel is shown making the first cut in the Crystal Ridge stripping near Hazleton, Pa. It will require about five years and the removal of approximately four million cubic yards of overburden to complete the job.

33 ft. 4 in.; overall width and length of revolving frame, 20 ft. 1 in. x 49 ft. 8 in.; height of A-frame above top of rail, 50 ft. 2½ in.; size of lower frame (center to center of main girders), 30x30 ft.; diameter of roller circle, 30 ft.; number of rollers, 84; diameter of rollers, 10½ in.; pitch diameter of rack gear on lower frame, approximately 26 ft. 9 in.

The base of this machine, which, as has been stated is 30x30 ft. in plan, is mounted on four propelling trucks, or one at each corner. These are of the four-wheel equalizing type, all the wheels being double-flanged drivers. Three-point suspension is provided, two trucks being attached to the base directly and the other two supporting an equalizing beam that is attached to the base at its center. An even distribution of load on the trucks is thus obtained.

Jackscrews are attached to either end of the equalizing beam immediately above the truck centers. When the shovel is in operation these screws are tightened between the truck and a plate on the shovel base, thus relieving the equalizing beam of excessive load. When the shovel is to be moved these screws are slackened off leaving the trucks free to follow any irregularities of the track.

Power for propulsion is transmitted through a vertical shaft extending downward through the pivotal center of the machine and geared to the shaft of the hoist drum. A jaw clutch engages or disengages the propelling mechanism. The vertical shaft drives a horizontal transverse shaft beneath the base, which at its extremities carries double chain sprockets provided with jaw clutches. This arrangement permits the driving of all trucks or those of one side only. Chains connect these sprockets with the intermediate shafts of the trucks. These chains are of the pin-and-bar type and have a positive grip on the sprockets.

TRANSMISSION MADE BY ALTERNATING CURRENT

Three-phase alternating current is brought to this machine at 2,200 volts by means of suitably insulated cables passing over the side of the bank and thence down into the open cut. At the center of rotation of the upper frame of the shovel suitable collector rings are installed. These are provided with brushes and serve to conduct the current from the stationary base to the revolving superstructure. These rings are adequate for the purpose intended and readily accessible for inspection.

Upon entering the machine current is passed through a Ward-Leonard controlled motor-generator set which furnishes direct current to the hoist, swing and thrust motors. This machine is a direct-connected five-unit set mounted in the rear end of the revolving frame. It is so designed that it will operate successfully, even when the shovel is working on a considerable grade. This set is driven by a 435-kva. 0.8-power factor synchronous motor, directly connected to and mounted upon the same bedplate with the hoist generator which is rated at 150 kw. and 250 volts direct current. This latter machine is fitted with differential compound windings. The exciter, which is also direct-connected, is rated at 20 kw. and 125 volts. This machine is flat compound-wound. The swing and thrust generators rated at 75 and 50 kw. 250 volts direct current respectively, both differential compound-wound, are mounted on a separate bed plate but are driven through a flexible coupling.

Three 7½-kva. single-phase transformers supply low-voltage alternating current to a small air-compressor

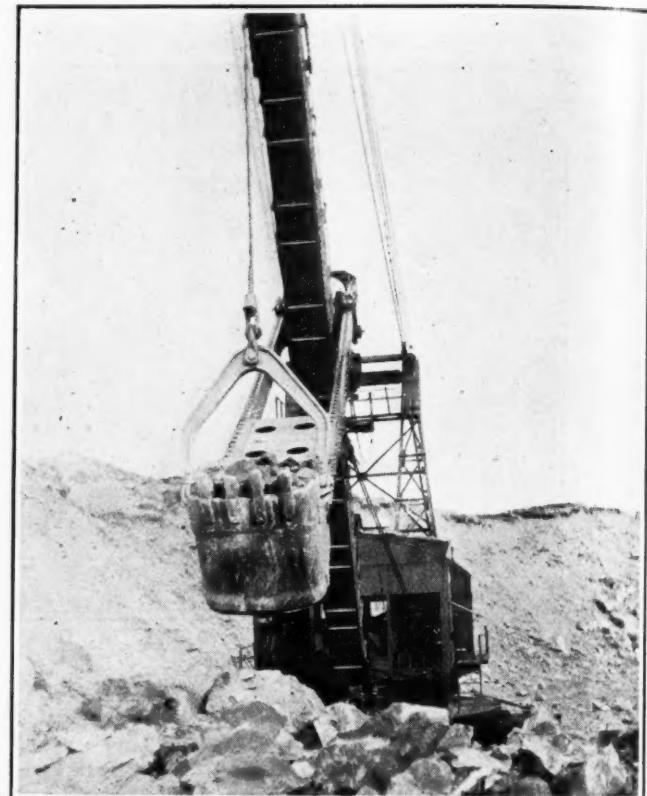


Fig. 1—Six Cubic Yards at One Dip of the Bucket

An idea of the kind of material that the shovel must handle may be gained from the rocks in the foreground. Despite the sturdy construction of the dipper the renewable points of the teeth are occasionally torn off by the severe digging.

motor, to the dipper-trip motor and to the lights carried on the revolving frame.

The main hoist is driven by two motors each of 225 hp. The main hoist cable is single, of 2½-in. diameter and is wound on a grooved drum, machined to a pitch diameter of 54 in. This drum is of sufficient length to permit the hoist rope to be wound to the highest position of the dipper without exceeding a single layer. The drum carries two outside friction bands lined with basswood blocks. These frictions are operated by an air cylinder.

The mechanism operating the lowering brake is controlled automatically by means of a spring, an air cylinder and a magnet valve. This, however, does not prevent the brake from being applied by means of a foot treadle.

The swinging motor drives a vertical shaft through two spur- and one bevel-gear reductions. A spur pinion on this shaft engages the swing rack on the base of the machine and a friction clutch protects the mechanism from overload. The second intermediate shaft of this mechanism carries a band brake that is applied by means of a strong spring and is released by an air cylinder.

On this shovel the boom is built up of structural steel shapes and plates and is of the box-girder type. It consists of heavy angles at the corners connected on all four sides by plates. Diaphragms are placed at suitable points along its length to afford torsional strength. At its lower end heavy steel-casting feet, securely riveted to the plates and angles, are provided. Wire guy ropes extend from a point near the center of the boom to the outer sills of the revolving frame. The boom is provided also with independent safety guys.

The thrust motor, and the intermediate and shipper

shafts are mounted on two steel foundation plates securely riveted to the boom. Two saddle blocks are mounted on the shipper shaft, each straddling a rack pinion and one member of the double dipper handle. These saddle blocks are of heavy design and of the roller type. All this machinery is protected from overload in case of emergency by a slipping clutch. The intermediate shaft is provided with a band brake which is applied by means of a heavy spring and released by an air cylinder.

It has already been stated that the hoist rope is single, and of 2½-in. diameter. The sheave at the point of the boom over which this cable passes is of 90-in. diameter; the groove in its rim is machine-cut and the hub is bronze-bushed.

The boom is suspended by a 12-part tackle and is raised or lowered by means of a drum geared to the main hoisting shaft. This drum is carried on an independent shaft, is actuated by a jaw clutch, and is held by a dog which engages a ratchet wheel when the shovel is in operation.

DIPPER AND HANDLE MADE "EXTRA STRONG"

As in many of the large shovels of recent construction the dipper handle on this machine is double. That is, it is composed of two members straddling the boom. These two members are tied securely together at both ends by means of heavy separators, built up of plates and structural shapes. Each member of this handle consists of a wooden beam reinforced with steel bars. The racks fastened to their under sides as well as the pinions meshing with them are nickel-chrome steel castings. The dipper is attached to the extremity of the handle by means of steel hinge castings.

The dipper is of the square-back type, fitted with four center or digging teeth, provided with renewable points. The digging that this shovel has to perform is of the hardest kind, and the dipper is built to withstand the extreme duty and wear to which it will be subjected. Spring buffers are provided on the door hinges to absorb the shocks entailed in dumping.

A somewhat unusual but highly efficient detail embodied in this machine is the equipment used for tripping the door of the dipper. This operation is performed by means of a small totally inclosed alternating-current motor mounted on the under side of the dipper handle. The shaft of this motor is coupled to a drum upon which the trip rope, or in this case a

chain, is wound. To discharge the contents of the dipper, therefore, the shovelman merely closes a switch. This energizes the motor, which in turn trips the dipper.

All the direct-current motors installed on this machine are of General Electric make, designed to withstand the high peak loads, and the intermittent, varying-speed, reversing service incident to shovel operation. They are of steel-mill type with steel-casting frames, split horizontally, and fitted with fire-proof insulation, commutating poles, and series field windings. The frames are of the open type on the hoist and swing motors but of the inclosed type on the thrust motor.

All these motors are controlled by varying the fields of the generators that supply them with current, a separate generator being provided for the hoisting, thrusting and swinging operations. Master controllers manipulated by the shovel runner govern the generator field current, thus varying the speed, torque and direction of rotation of the several motors. The maximum torque of the hoist and thrust motors when the dipper is stalled in the bank, or that of the swing motor when it is accelerating, is limited by the differential field winding of the generators. As the current taken by the motor increases, the series field of the generator builds up, counteracting the shunt field, thus limiting the current taken by the motor. This holds the motor torque to a safe value even when the shovel operator holds the controller handle full on.

The hoist controller is so arranged that the weight of the descending dipper and handle drives the hoist motor as a generator, thus returning energy to the power line. This arrangement not only saves power and practically eliminates brake wear, but also makes the shovel easy to operate as it obviates the necessity of disengaging the hoist friction, lowering the dipper on the foot brake and then throwing the friction in again when digging is to begin.

All motors are protected against plugging or reversing, so that the machine cannot be jerked or the commutators damaged should the operator reverse the motors while they are running. All brakes are controlled by the motor controller handles through magnet valves. Thus any brake is set when its controller handle is in the off-position. The brake is released when the handle is thrown to either forward or reverse running position.

FIG. 2
Loading a Trip

Spoll may be placed on the car 187 ft. horizontally from, and 65 ft. above, the point from which it is dug. As shown, the dump cars may thus be spotted well back on the wide berm, provided alongside the shovel. This is an excellent feature where the ground is loose and the track accordingly uncertain.



An emergency trip is provided. Thus the shovel runner can apply all brakes and "kill" all generator fields almost instantly by pushing a conveniently located button. An alternating-current motor-driven compressor of about 25-cu.ft. per minute capacity, fitted with reservoir and governor, furnishes air for the operation of the various clutches and brakes. The pressure carried is about 90 lb. per square inch.

The lighting equipment comprises two flood lights, so mounted as to illuminate the operations of the dipper, and a number of smaller lamps lighting the interior of the shovel house, the various machinery units, the outside platforms and the area immediately surrounding the machine. A portable lamp with extension cord is also provided. All light wiring is in conduit, and 110-volt bulbs are used. So far as possible all electrical conductors are run in conduit.

Spoil dug from the bank is discharged into Clark automatic air-dump cars, each of 30-cu.yd. capacity. Each of the 40-ton locomotives can handle two of these cars per trip. It normally requires from five to seven dips of the shovel to fill a car. These cars and locomotives operate over standard gage (4 ft. 8½ in.) tracks laid with 80-lb. rails. The maximum distance the spoil is hauled will not exceed two miles and the steepest gradient traversed will not exceed 2½ per cent.

Arrived at the spoil bank both cars of a trip are dumped almost simultaneously by one man who merely throws a small lever or cock upon each car. Fig. 3 shows two cars in the act of dumping. Compared with the small hand-discharged contractors' side-dump car, used even today at many stripping operations, these cars represent a big step forward.

This Crystal Ridge stripping offers a good example of how coal deposits, or what is left of them, are today being reclaimed through the use of modern equipment. This basin of coal was first "worked out" by underground methods and abandoned. Next the outcrops were worked by steam shovel and after these machines had gone as far as their economic limits would permit the deposit was again abandoned. Now comes the big electric shovel by means of which all the coal left by the earlier methods—which forms a goodly portion of

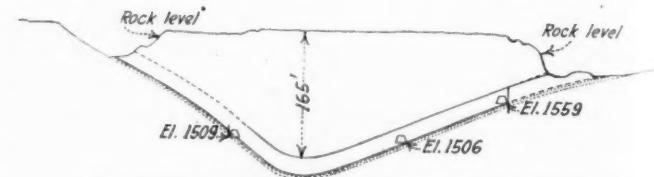


Fig. 4—Shovel Is Excavating a Natural Basin

Like most of the coal beds in the anthracite region, that at Crystal Ridge is folded. The crop has already been stripped and the rest of the coal has been partly worked, but much of it still remains and it is profitable to remove as much as 165 ft. of cover to get at it, as the bed is 25 ft. thick, and the product will be that luxury coal, anthracite.

the original deposit—will be reclaimed. This is true conservation. The same means and methods that are used here doubtless can be applied to many other coal basins throughout the anthracite region and elsewhere.

Experiments on Rope Testing Progress

Investigations are being actively prosecuted into the fatigue of ropes by the U. S. Bureau of Standards, says the annual report of the Director. An advisory committee composed of representatives of national technical societies, Government departments, and large users and manufacturers of wire rope was organized and has been of great assistance in outlining the investigation.

The method which appeared to be most promising is that of magnetic analysis. This method has received much study as a nondestructive means of testing iron and steel products, but it was at once recognized that no magnetic means has yet been developed which gives results that are unambiguous and capable of definite interpretation. Therefore it was necessary to make investigations of a basic and fundamental nature to establish the relations between the magnetic properties of wires used in wire rope and the effect of the various causes of deterioration in wire rope in service.

A study of the effect of mechanical stress on the magnetic properties of steel wire has been completed and is nearly ready for publication. An investigation of the effect of wear is nearly completed, and work is in progress on the effects of fatigue and corrosion. Apparatus for field tests of rope is being designed and constructed.



**FIG. 3
Over She Goes!**

Two 30-cu.yd. car loads of spoil are being dumped simultaneously by one man who merely throws two small levers. This operation is in marked contrast to the discharge of a trip of small hand-operated dump cars such as are still in use at some stripings. The height of the car above the rail makes the rock fall some distance from the track making it possible to keep the ties well back on the solid.

One Company Meters Its Loads at a Common Point Cutting Electric Bills 19 per Cent

Distribution Lines Have Their Peak Loads at Different Times, Hence, When Energy Is Measured at a Central Point the Combined Demand for Power Is Relatively Steady, Earning the Company a Better Rate

By A. MACDONALD

Chief Engineer, Keystone Coal & Coke Co.,
Greensburg, Pa.

TODAY, MOST COAL operators admit the economy of purchased power, but many let it go at that, apparently not realizing the possibilities of what can be done at their end of the line toward cutting their power costs. The Keystone Coal & Coke Co., of Greensburg, Pa., has made surprising reductions in cost by giving close attention to the utilization of electric power and by a unification of distribution lines so as to be able to take advantage of a central metering point.

Definite figures cannot be given of the savings which the various changes hitherto made have effected because the present methods of keeping records have grown up rather than been inaugurated at a definite date. However, on the new distribution system concrete figures are available, and the officials are quite certain that an average saving of 19 per cent in monthly power bills has been made. In a field where power costs can be expected to run as high as 18c. per ton this saving is no insignificant sum.

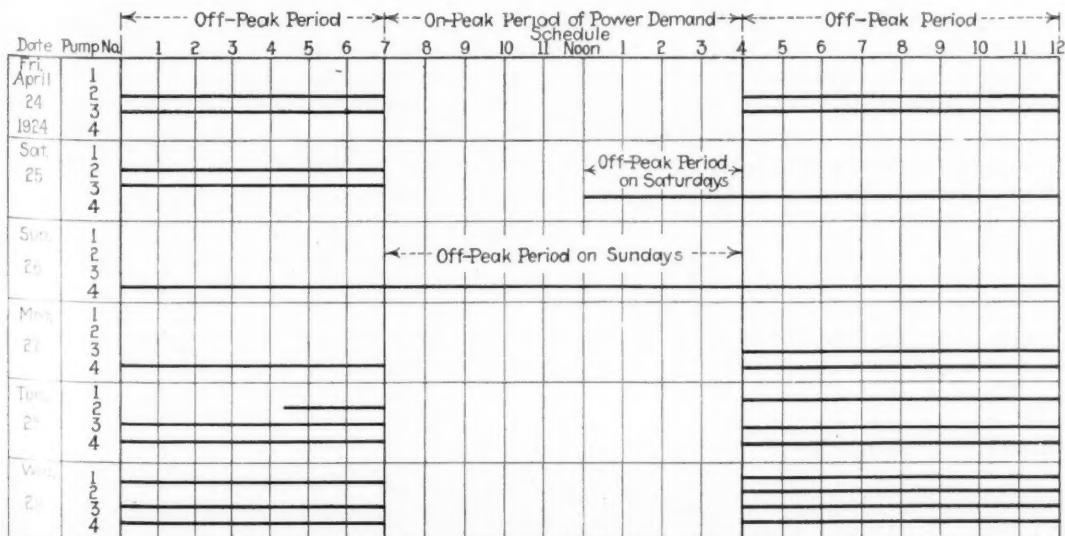
It was made possible by an arrangement, which the coal company completed last April, which provides for a central metering point at which is measured all the power purchased for the operation of its mines in the Greensburg basin. Formerly the monthly bills were computed from readings of six metering stations connected to 2,300-volt lines. Now all power is purchased at 25,000 volts and is metered at one central point. To make this change a large investment was made to install a new 25,000-volt distribution line and new switching, metering and transformer equipment. However, the rate of return on this investment is such as to make the installation stand out as an example of what can be done by taking advantage of wholesale power rates.

When considering the changes necessary for establishing a central metering point a careful estimate of the possible saving was made. After an exhaustive study of the demand charts of the six existing metering stations had been made it was estimated that the new arrangement would make possible a reduction of 17 per cent in the total power cost. The fact that this figure is so close to the saving of 19 per cent actually made indicates the accuracy with which such results can be predicted when dependable information such as that supplied by meter charts is available.

Power for this group of mines in the Greensburg field, and also for the other operations of the Keystone Coal and Coke Co., is purchased from the West Penn Power Co. The bills are computed according to Schedule J which is about the last word in rate making as based on the many and varying conditions affecting the cost of power delivered to the customer.

This schedule, allows a premium to customers who co-operate with the power company by helping it to reduce line losses and the equipment investment necessary for the delivery of power in such quantity and at such times as is desired. The company can do this by improving the power factor, reducing the instantaneous and 15-min. demands, controlling the load so as to hold down the demand during certain periods of the day and by concentrating loads and thus co-operating with the public utility company.

The new 25,000-volt central metering station is equipped for a capacity of 6,000 kw. To date the highest peak load has been 2,500 kw. However, at present, with the mines operating at approximately 55 per cent capacity, 195,000 tons per month, the 15-min. demand is only about 1,800 kw. The new metering station is located at Crows Nest mine, which is near the center of



Visualizes Load

The heavy lines represent the periods of the day when each pump is in operation. This graph was made from the information reported from the Hannastown mine. When the graph is made it quickly shows the length of time each pump was in service. It is easy to detect which, if any, pumps are running during the on-peak period of the day. Note that on Saturday afternoon and all day on Sunday the pumps may be operated without being considered on-peak load.

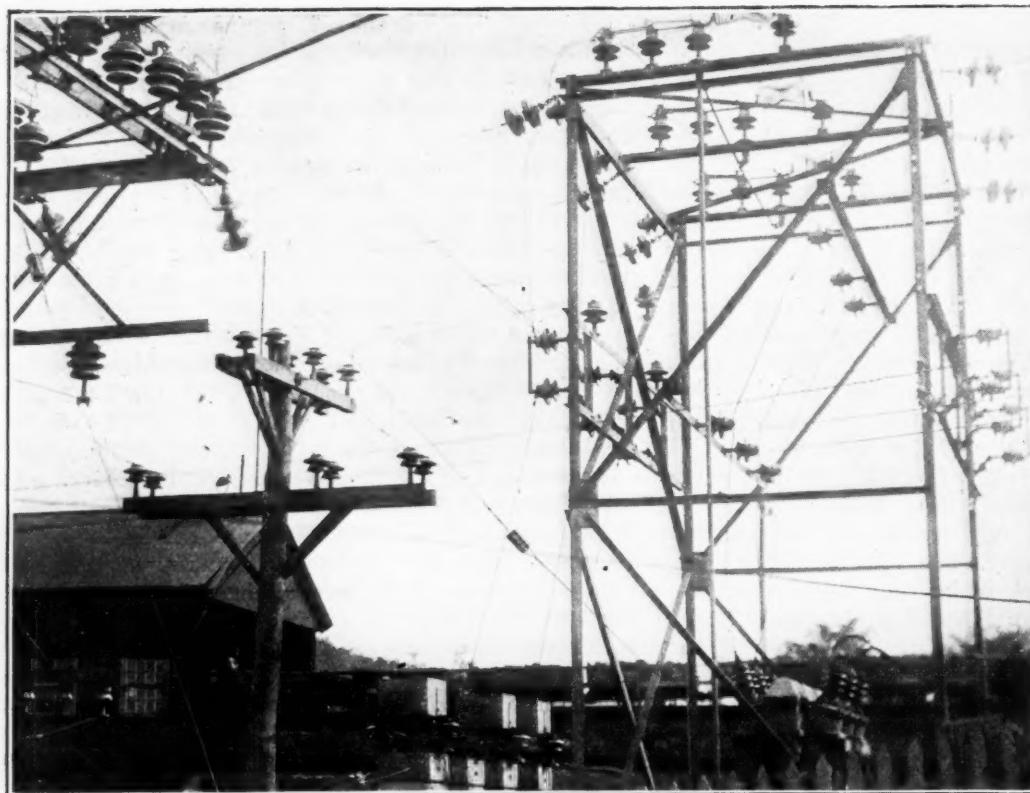
the Greensburg basin and therefore at the most advantageous point for the six operations served.

A noteworthy feature of the installation is the fact that the coal company also has its own set of meters, these being connected at the same point in the 25,000-volt line as those of the power company. There are two reasons why the coal company should have its own meters. Not only does it have the satisfaction of having a check on those of the power company, but by this provision it is enabled to have desirable charts and records for study.

The two sets of meters are mounted in weatherproof cast-metal boxes, installed out of doors on a concrete

former substation. These meters provide a means of determining just what saving is being made by the new arrangement. The combined demand at the common point, which is the billed demand, averages about 25 per cent less than the added demands of the six distribution meters. This reduction is due to the diversity factor, in other words to the fact that the 15-min. peaks of the various mines do not occur at exactly the same time. This 25-per cent decrease in demand is the item which cuts the largest slice off the company's monthly power bill.

The Keystone Coal and Coke Co. has now been operating since last April on the new arrangement and has



platform. This platform is at the base of the steel structure which supports the disconnecting switches and choke coils, and on which the instrument transformer connections are made to the 25,000-volt line. The boxes are set on concrete pedestals so that the meters are at a convenient height above the ground. The curve-drawing wattmeter is the most useful instrument that the company owns. It is from the charts of this meter that the average demand for the highest 15-min. load period of the month is obtained. Ordinarily, the maximum-demand records of the coal company and the power company are surprisingly alike. However, differences do occur, and when this happens representatives of the two companies get together and by comparing their charts easily locate the error and adjust the difference.

To distribute the power from the new central metering point at Crows Nest the coal company had to build about 18 miles of 25,000-volt lines. Wood poles and pin insulators are used, and disconnecting switches are installed on each branch. The line is well protected by oxide-film lightning arresters, one set being located at the metering point and one at each of the six transformer stations.

A curve-drawing wattmeter, owned by the coal company, is installed in the 2,300-volt line of each trans-

former substation. These meters provide a means of determining just what saving is being made by the new arrangement. The combined demand at the common point, which is the billed demand, averages about 25 per cent less than the added demands of the six distribution meters. This reduction is due to the diversity factor, in other words to the fact that the 15-min. peaks of the various mines do not occur at exactly the same time. This 25-per cent decrease in demand is the item which cuts the largest slice off the company's monthly power bill.

The Keystone Coal and Coke Co. has now been operating since last April on the new arrangement and has

found that the saving in power will pay for the entire installation in from three to five years, depending, of course, on the mine production.

Fully realizing the desirability of keeping down the maximum demand the company makes every effort to dispatch the loads to the best advantage. About the only really flexible part of the load is that established by the large centrifugal mine pumps. The pumpmen are instructed to see that the sumps are free of water and the pumps stopped before 7 a.m., which is the beginning of the on-peak period of the power schedule.

Except for possibly two or three months of the year, no pumping is done in the day time. In wet seasons, when it becomes necessary to pump during the day, as much as possible is done at periods which do not coincide with the peak loads caused by the operation of cutting machines, mine locomotives, hoists, fans, tipplers and washeries.

To be able to check and dispatch the loads it is necessary to have charts indicating the load characteristics of each important machine. Here is where the charts from the demand meters play another important part. The six distribution meters are geared for a chart speed of 3 in. per hour. The main meter is geared to 4 in. per hour. These charts properly show the characteristics of the load on each line.

Where Savings Are Made

The steel tower, arresters and instrument transformers are part of the new 25,000-volt central metering station which has made it possible for the Keystone Coal & Coke Co. to save 19 per cent on its monthly power bills. The transformers and wood pole structure at the left are part of the 25,000-volt to 2,300-volt Crows Nest mine substation.

Hannastown MINE			MONTHLY TIME SHEET FOR PUMPS April, 1924									Keystone Coal & Coke CO.					
Day of Month	Pump No. 1 Gal. Per Min. 1200			Pump No. 2 Gal. Per Min. 2300			Pump No. 3 Gal. Per Min. 2300			Pump No. 4 Gal. Per Min. 3800			Pump No. 5 Gal. Per Min.			Pump No. 6 Gal. Per Min.	Remarks
	Start	Stop	Hours	Start	Stop	Hours	Start	Stop	Hours	Start	Stop	Hours	Start	Stop	Hours		
A.M. 24				12:00	7:00	7	12:00	7:00	7								
P.M.				4:00		8	4:00		8								
A.M. 25					7:00	7		7:00	7		12:00		12				
P.M.													12				
A.M. 26													12				
P.M.													7:00	7			
A.M. 27							4:00		8	4:00		8					
P.M.								4:00		8	4:00		8				
A.M. 28				4:35	7:00	2 1/2		7:00	7		7:00		7				
P.M.	4:00		8					4:00		8	4:00		8				
A.M. 29		7:00	7					7:00	7		7:00		7				
P.M.	4:00		8	4:00		8	4:00		8	4:00		8					

Pumping Reports Like this Are Made at Every Mine. From These Records the Engineering Department Plots a Service Graph

Every mine submits a report showing the time each pump is in operation. All pump men are instructed not to run or even start a pump during the on-peak period of the power schedule. Aside from advantages to the power company there are many advantages to the coal company if it takes on-peak power only for that equipment which must be operated during that period. A pumping load added to the day load of the mines increases the maximum demand charge even if a pump runs for but a short interval of time.

The charts from these meters are used with the daily pump reports for determining if the pumps are responsible for any of the peak loads. The pumping records show the total hours and the exact time of day or night that each pump was in operation. A graph is made of these data, the operating periods of the various pumps being indicated by a series of colored horizontal lines. It requires but a glance at this graph to determine if any and how many pumps were operating at a given time.

In case it is found that a pump was running at the time of a peak load an investigation is made to determine if the pumping was necessary. As the larger pumps are equipped with 400-hp. motors, the operation of any pump shows up clearly on the chart of the respective distribution meter, even though it takes place at the same time as the heavy fluctuating day load. This

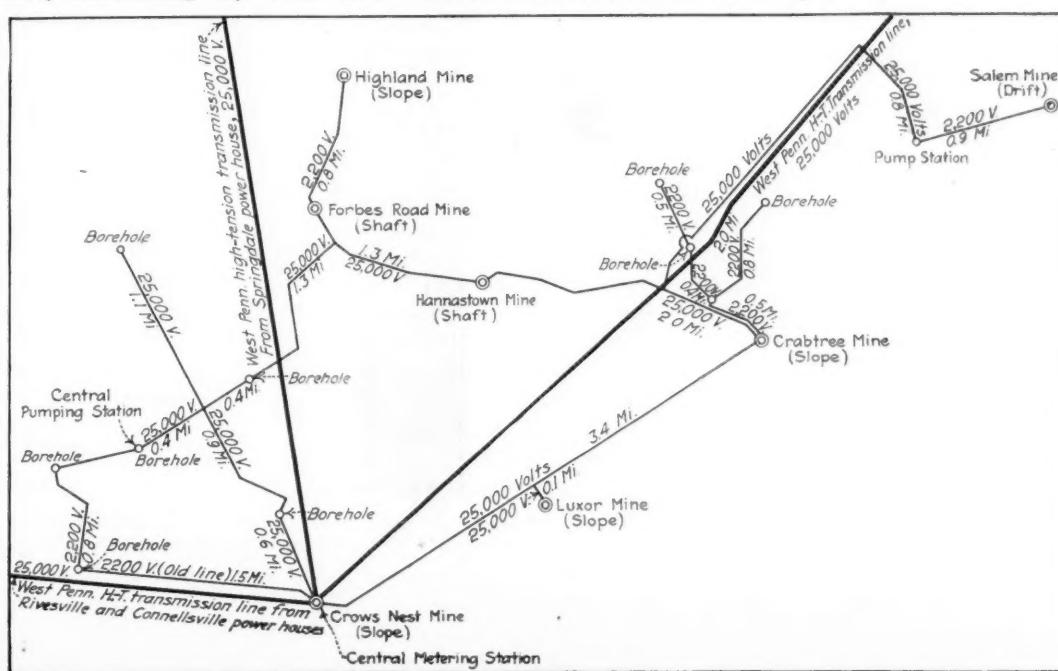
fact makes it possible to check at any time the daily reports made by the pumpmen and therefore prompts the men to keep accurate records.

The methods taken by the Keystone Coal and Coke Co. to obtain the most advantageous power rate, and its constant effort to hold down the maximum demand has resulted in reducing its overall cost per kilowatt-hour so as to compare favorably with that of the customers of the West Penn Power Co. having the lowest rates. Low rates, of course, are not the only consideration of purchased power.

The Keystone people report that interruptions are almost unknown. Although the company operates mostly shaft mines, and electricity is used to the exclusion of steam for all drives, such as ventilating fans, hoists, pumps and driving generating units, no auxiliary drives have been found necessary.

Power Always Available

Power is supplied over three widely separated circuits to the common metering point at the Crows Nest Mine of the Keystone Coal & Coke Co. Here power failure is but a remote possibility. All the distributing lines to the various mines are under the control of the coal company and these are interconnected so that almost every mine may receive energy over two routes.





Marvel Village, Bibb County, Alabama

Marvel Plant Largest of Any in Cahaba Field

All Coal Drawn from Steep Slopes—Pitch Near Surface 15 deg.—Vibrating Screens and Tables Used for Cleaning Coal
—Equipment Provided for Every Ordinary Type of Repair

ONE OF THE leading mines in the Cahaba field of Alabama is that of Marvel, belonging to the Roden Coal Co. The coal which is of the Clark seam is 48 in. thick and lies at the outcrop on a pitch of 15 deg. At a point 5,000 ft. distant from the outcropping the pitch has decreased till it is only 5 deg. It is estimated that the bottom of the basin will be reached 3,000 to 4,000 ft. further in. The coal is a high-volatile bituminous fuel and makes an excellent domestic fuel, of the following analysis: Moisture, 0.57 per cent; volatile, 36.81; fixed carbon, 57.96; ash, 4.66; sulphur, 0.65. Its heating value is 14,200 B.t.u. As the coal has a rash under it and a parting, that at times disappears and at other times is 3 in. thick the screenings have to be washed.

The coal is loaded at the face in 1½-ton mine cars. It is hauled by mules to the slope, assembled into fifteen-car trips and hoisted to the tipple. At Mines Nos. 2 and 3 the slopes have double tracks. Coal from No. 3 mine is hauled by a 16-ton steam locomotive over a track laid with 60-lb. rail to the tipple of No. 2 mine.

Here, coal is discharged on a crossover dump into a 20-ton bin from which it is delivered to a plate feeder which in turn delivers it to the main shaking screen, where three sizes are made; 3-in. screenings, 3x6-in. egg and 6-in. fancy lump. The lump and egg sizes then pass over loading booms to railroad cars, the screenings being conveyed to a 1,500-ton coal bin. Under this bin run two concrete tunnels where, on apron conveyors, coal is conveyed to four universal vibrating screens on which the coal under ¼-in. is removed for washing on two Plat-O and two Deister-Overstrom tables.

The coal between ¼ and 3 in. is washed on two Shannon jigs. After the coal leaves the jigs the ¼- to 3-in. coal may be remixed with the coal under ¼ in. and loaded as 3-in. steam or it may be passed over a shaking screen, where the 1x3-in. nut is taken out. The ¼- to

1-in. coal is then mixed with the coal below ¼ in. to make a 1-in. slack. Nut coal, when made, is conveyed by a belt conveyor to a 90-ton bin over the railroad track and rescreened before loading into cars. It is then carried by loading booms and discharged carefully by them into the railroad cars. The ash in the 1-in. washed slack and in the 3-in. steam averages from 6½ to 8 per cent.

One-inch slack is used in the Wickes vertical water-tube boilers for the generation of steam at the mine. Of these there are three, each of 300 hp. capacity and equipped with Murphy stokers. Natural draft is provided by a steel stack, 150 ft. high and self supporting. Its diameter at the base is 14 ft. and at the top, 6 ft.

At No. 2 mine the coal is hoisted up the slope by a 28x48-in. double engine with an 8-ft. drum having steam-operated brakes, friction and reverse. The hoist at No. 3 mine is a 24x36-in. double engine with a 6-ft. drum having steam friction but brakes which are operated by hand. Two belted Sirocco fans are installed, one of 72-in. and the other of 96-in. diameter. These are belted to 2,200-volt induction motors. To remove the water collecting in the mine three four-stage centrifugal pumps are provided capable of acting against a 436-ft. head, one with a capacity of 280, one of 440 and a third of 570 gal. per minute. Single-drum electric hoists are used for sinking slopes and manways and small triplex pumps, motor-driven, remove the water from the slope faces.

Mine No. 3 has four inclined entries, the two center slopes measuring 7x10 ft. and being used for haulage. The return airways which are placed one on each side of the haulageways measure 6x13 ft.

Permanent construction has been used everywhere. The boiler house, power house, shop and fan house are of brick with steel roof trusses and a tile roof. The washer, tipple and No. 3 hoist house are of steel-frame

construction covered with galvanized corrugated iron. Steel window sash affords copious light. The equipment in the power house outside of the main hoist for No. 1 mine is a 150-kw. and a 225-kw. steam driven 2,200-volt generator with a five-panel switchboard and a 10-ton crane which travels the full length of the building.

The shop contains a 50-ton hydraulic press, a 6x6 power hack saw, a 22-in. x 8-ft. engine lathe, a bolt and pipe machine, a power punch and shears, a 26-in. drill press, a 6-in. pipe machine, a power hammer, an air compressor, a rock-drill sharpener, a band saw, two blacksmith's forges, four emery wheels, a welding and cutting outfit and electric and air drills for wood and metal—quite a complete equipment for a plant only thirty-one miles from a big and well-equipped city like Birmingham. Scrap lengths of round iron are bolt-headed on the drill sharpener by the use of special dies and then threaded on the bolt machine.

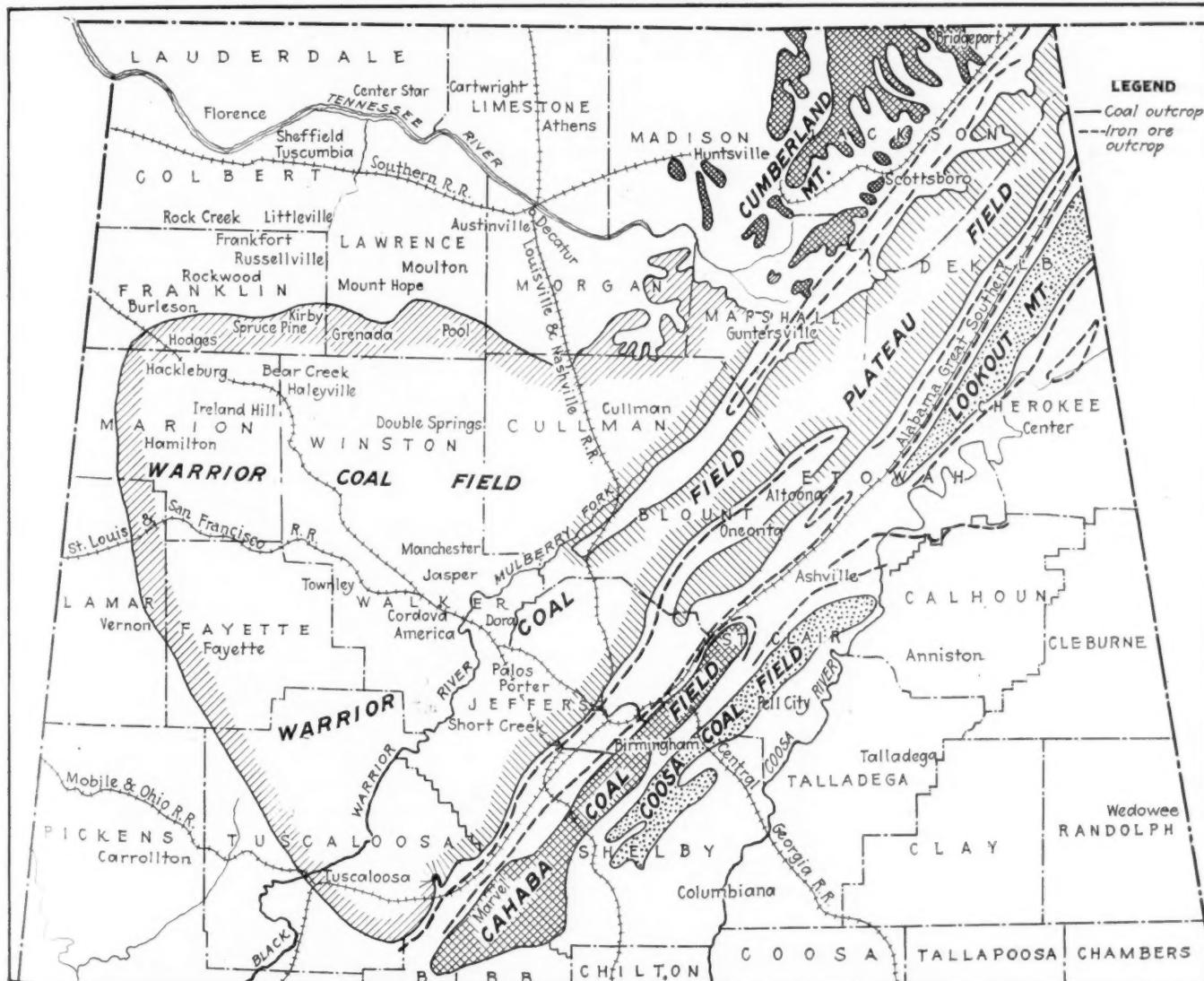
Two supply houses keep the mine free from delays. One house, measuring 28x78 ft. keeps small items in



Company Store at Marvel

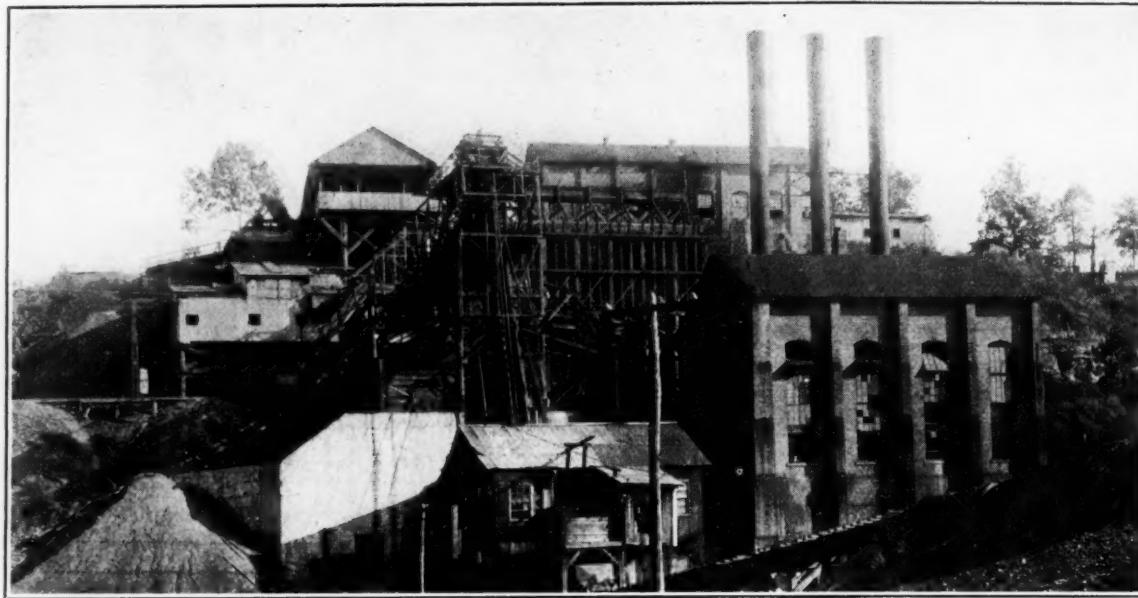
This store, which supplies almost every conceivable need to the over three hundred families domiciled in Marvel, measures 60 x 120 ft.

stock, the other, which is two stories high and 48x60 ft. in plan, is used to keep on hand heavy items such as reserve pumps, wire ropes, sheaves, pipe, bar iron, large gears, dwelling-house repairs, such as doors,



The Seams in Alabama Lie in Basins the Outlying Edges Often Dipping Heavily

The largest coal field is the Warrior of which the Plateau field forms a part. The latter field, however, has not in general been found profitable to operate. The Coosa field also is little operated. The Cahaba field, in which is the Marvel Mines of Bibb County, has several active mines, engaged in the production of coal for domestic and industrial purposes. It is 68 miles long and 5 to 8 miles wide and it covers a surface area of 394½ square miles. Most of the seams pitch, have a weaker roof than those in the Warrior field and make more water than the seams in the latter field. The mines also contain much methane. In 1923 the tonnage from the Cahaba field was 2,966,505 tons of which 1,198,110 tons or nearly one half was from Bibb County, which lies to the extreme south.



Tipple and Washer at Marvel. Alabama Mines Are Keen Advocates of Coal Washing

As all the coal in the Cahaba and Warrior fields has its partings, washing of coal is the general practice. Much aggressive action has been taken. This washer has, for instance, both jigs and tables, the coal between $\frac{1}{2}$ and 3 in. going to jigs and the still smaller coal being cleaned on the tables. The ash in the 1-in. washed slack and in the 3-in. steam runs from $6\frac{1}{2}$ to 8 per cent.

windows and roofing, extra motors, spikes, nails, etc. During working hours a supply clerk is in attendance. Supplies are handled solely on presentation of written requisitions and a perpetual inventory is kept.

For the employees 305 dwellings, a 60x120-ft. store and two school buildings, one for white and one for colored children, are maintained by the company. The dwellings have running water and electric lights. The streets have been graded and covered with 6 in. of crushed sandstone and 3 in. of crushed slate from the company's rock-crushing plant which also furnishes crushed sandstone for concreting. All the overcasts in the mine are built of concrete. The stoppings are of brick. As many thousands of cubic yards of concrete have been used, a one-bag motor-driven mixer has been provided, as well as a one-third bag hand mixer for smaller work.

WATER SUPPLY OBTAINED FROM SPRINGS

For boilers and domestic supply, water is obtained from springs $1\frac{1}{2}$ miles from the power house, the water for domestic purposes being stored in a 50,000-gal. concrete tank mounted on a 60-ft. concrete tower. Fire plugs and several thousand feet of $2\frac{1}{2}$ -in. hose scattered around the town provide fire protection. Non-acid mine water is used in the washer, for strange to say the mine waters of Alabama are unusually free of acidity. A 400,000-gal. concrete-lined reservoir is used to store water for the washer, a 60,000-gal. reservoir provides the water for No. 2 boilers, and a 40,000-gal. reservoir that for No. 3 boilers. The outside water mains are of 4- and 6-in. bell-and-spigot pipe, and all the underground discharge lines are of 6- and 8-in. Universal pipe.

B. F. Roden is president of the company and the active superintendent of its operations. The mines are located on the Louisville & Nashville and Southern railroads.

Cauca Valley Coal Convenient to Panama

Four hundred and fifty miles from the Panama Canal in the Department of El Valle is the coal field of Cali, located in the Cauca Valley of the west coast of Columbia, only a few miles inland from the Pacific Ocean. It is connected with the port of Bona Ventura by the Pacific R.R. Cali is the capital of the Department of El Valle.

The region immediately surrounding this city is not well suited for mining, says the *Municipal Gazette* of Cali, but nevertheless its principal wealth consists of coal of which there are extensive deposits. The beds which have been discovered are on the western slope of the Andes Mountains and extend for a distance of more than 52 miles. There is every indication that other deposits exist in the neighborhood which will be exploited some day in the future.

The coal that is now being mined is a semi-bituminous fuel, having the following analysis: Carbon from 68 to 71 per cent; volatile matter, 23 per cent; ash, 5.4 to 7.6 per cent; sulphur, 0.8 per cent. Large quantities of coal are needed not only on the Panama Canal but at many points on the west coast of South America both for railroads and steamers. Practically only in Chile can any native coals be found on the market.

At the present time six coal mines near Cali are being operated, the aggregate production of which is about 3,000 tons per month. Nearly all of this is consumed by the Pacific R.R., the cost to that railroad being \$5.44 per net ton. This production is low because only rudimentary and costly methods of operation are employed, no new or modern machinery being used. With these installed all the steamers which run up and down the west coast of South America could be supplied with Cali coal, and it could be shipped to Peru, Ecuador and Chile, all of which offer a splendid market for this product.

Engineers of Western Penna. Comment on Rock Dust

May Rockdusting Lawfully Replace Water
Sprinkling?—Dusting of Shotholes—
Getting Dust Into Aircourses

AT A well-attended meeting of the Engineers Society of Western Pennsylvania, Mining Section, on the evening of Nov. 24, in the William Penn Hotel, Pittsburgh, Pa., a paper on "Rock Dusting in Bituminous Coal Mines," was read by T. G. Fear, general manager of the Inland Collieries Co. Mr. F. A. McDonald presided, and in introducing the speaker said, "In the last fifteen years in this country 215 explosions killed 4,400 men. A thought of these catastrophes in itself is enough to drive any conscientious man to rock dusting."

"Aside from preventing coal-dust explosions, rock dusting," said Mr. Fear, "improves materially underground illumination; it lodges on wood timbers and makes them fireproof and to an extent, protects the roof from the slacking action of the air." Rock dust stemming is advocated in shooting, because it produces more lump coal, decreases smoke and suspends incombustible dust in the air at the instant when the danger is greatest that coal dust will be ignited by a blown-out shot. Of the particles of coal dust brushed from a timber set in the Indianola mine as much as 83.5 per cent pass through a 200-mesh screen. This indicates the explosive quality of the dust. It has been proved that average bituminous coal dust so long as it will pass through a 20-mesh screen is of an explosive character.

Basing his figures on his experience in the Indianola mine, Mr. Fear said a mine producing 61,000 tons of coal per month can rock dust at a cost of two mills per ton applying the dust three times a year; if the rock dust is applied four times a year the cost would be three mills per ton. (These figures apply only to the rock dusting of haulage entries, not aircourses, and assume that the rock-dusting program is well under way.)

In the discussion that followed, W. L. Affelder asked Mr. Fear if he sprinkled the Indianola mine with water before he started rock dusting. "Yes, extensively," said Mr. Fear. "How then," continued Mr. Affelder, "are you going to get around the Pennsylvania mine laws which specify in no uncertain terms that the mine must be sprinkled?" According to T. G. Fear, there must be a way around this difficulty. Illinois operators do not water-sprinkle rock-dusted areas. "Anyway," he interrogated, "isn't rock dusting sprinkling?" Mr. Affelder wondered what the defense would do if a state mine inspector would take a company to court that is rock dusting charging it with breaking the state mining laws.

Mr. Fear thought a state inspector would have no grounds for accusing a company of breaking the law but Mr. Affelder said the present mine laws of Pennsylvania were obsolete, and put the inspector, operator and miner alike in an extremely difficult position. Mr. Fear said that Secretary Walsh intended to endeavor to put a clause requiring rock dusting in the mine law at the next meeting of the state legislature. The Federated Engineering Society has appointed a committee to decide what shall be called standards in practice in rock dusting so that these might be utilized by the members of state legislatures in making mine laws.

A. R. Chambers, of the Michigan Limestone & Chemical Co., said that the cost of pulverized limestone, at the sending end is not high, but the railroad freight rates may be, and usually are. Marble dust has been shipped from Vermont into the Pittsburgh district, but the freight rates made delivery cost prohibitive. His company quarries limestone at the Port of Calcite, 200 miles north of Detroit and ships the screenings by water to Buffalo where they are pulverized and distributed.

Mr. Fear described one of his methods of getting dust on his aircourses. A hole is knocked into a stoping through which a 4-in. galvanized sheet-iron pipe is inserted. One end of this pipe is connected to the distributing machine and to the other end are attached 10-ft. sections of the same kind of pipe to give whatever length is desired. Short sections of automobile-tire inner tubes are sometimes used over the pipe joints. This method works quite satisfactorily.

In a single day twenty samples of mine dust can be taken and tested by the volumeter method to ascertain the percentage of incombustible material, said Mr. Fear. He recommends the use of rock-dust barriers on main return entries in addition to dust floated in on the air-current.

Air Lift and Mines of Japan Interest Anthracite Engineers at Scranton

AT A MEETING held by the Engineers' Club of Scranton, Nov. 25, light was thrown on the unwatering of the Taylor mine and on the peculiar difficulties with which Japanese coal-mining engineers have to contend in their work, the papers being illustrated by lantern slides and diagrams.

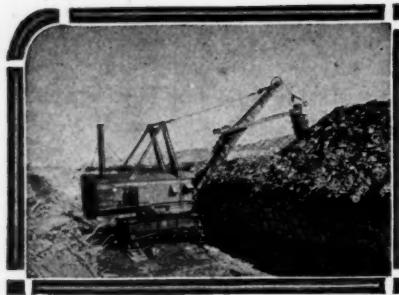
Herbert Axford, formerly hydraulic engineer for the Glen Alden Coal Co., and now with the Ingersoll-Rand Co., read an interesting paper describing the use of the air lift at the Hampton Pumping Station of the Glen Alden Coal Co.

Last summer when the Lackawanna River broke into the Taylor mine the water completely submerged the Hampton pumps, located in the Clark bed, and also filled the Dunmore beds Nos. 1, 2 and 3 which are below the Clark.

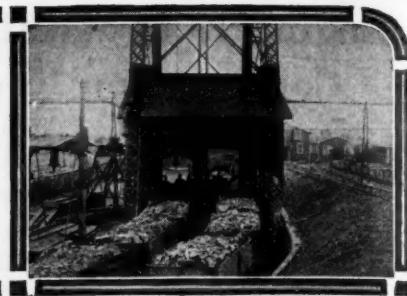
There was no feasible way to get to the Dunmore beds and install pumps, therefore three air lifts were used. Two of these lifts discharged through 16-in. pipes and the third through a 12-in. pipe. Between April 30 and Aug. 14 these lifts raised 660,000,000 gal. of water from the Dunmore beds to the Clark bed where five 5,000-gal. per minute centrifugal pumps delivered the water to the surface.

J. W. White, manager of the Scranton office of the Jeffrey Manufacturing Co., spoke about his recent trip through the coal fields of Japan. Mr. White's story was well told. He spoke of his personal experiences inside and outside the mines. "Cheap labor and the employment of girls and boys in the mines prevent the extensive use of machinery in the mines of Japan," said Mr. White.

The high temperature—at places it is 90 deg. F.—and the dampness of the mine interior, often near the saturation point, make it extremely difficult to mine coal in Japan. Nearly all the mines are started from the outcrop and there are few mine shafts. One of the mines visited by Mr. White extended about three miles under the sea; another mine he saw has since become a geyser, boiling water now coming up the shaft.



News Of the Industry



Brophy Rejects Proposal to Adjust The Jacksonville Wage Agreement; Seeks Curb on Opening of New Mines

Flat refusal is the reply of the executive board of the United Mine Workers of district 2 to the recent letter of the Central Pennsylvania Coal Producers' Association proposing a readjustment of the Jacksonville wage agreement. The union officials disclaim the predictions of prosperity imputed to them in the communication from the operators and declare that the only solution of the problem brought about by the depressed condition of the coal industry in central Pennsylvania is "the development of new coal fields, and the opening of new mines must be checked until the demand and the supply counterbalance." The statement of the miners, which is signed by John Brophy, president; James Mark, vice-president, and Richard Gilbert, secretary, is as follows:

"Permit us to call your attention to the fact that you err in imputing to us the prophecy of 'prosperity' of which you speak in your letter of Nov. 7. To the *Coal Trade Journal* of Aug. 20 belongs that honor. The rôle of prophet has ever been assumed by the operators and not by the miners.

"For instance, in your statement dated April 2 you said it was agreed by many in the business that central Pennsylvania would not produce more than 15,000,000 tons throughout the coal year. However, up to Oct. 18, according to your own figures, we produced 30,670,782 tons.

Output Up Despite Gloom

"The *Coal Trade Journal* states on Nov. 12 that 'central Pennsylvania is sharing in the improved conditions in the industry in the country at large; that October loadings amounted to 66,782 cars, proving larger than anticipated and were the largest of the year except January.' Again in the same issue it says 'optimism prevailed in the country's bituminous markets during the past week' and that 'the consensus of opinion was that the next two weeks would see a marked increase in demand and that the worst was over.'

"These statements are more nearly in accord with the facts than such as have been issued periodically by the officers of your association ever since the present contract was signed on March 29 of this year. This contract your association signed voluntarily, yet the ink of the signatures was scarcely dry when you issued (April 2) a state-

ment which could have no effect other than undermining confidence in the contract.

"It is true that when you were questioned as to whether you would stand by the contract you stated (April 19): 'The present wage agreement for a period of three years will be carried out as faithfully by the operators as all preceding agreements.' Yet you have continued to issue from time to time statements carrying prophecies of practical ruin unless there were reductions. Is this an evidence of good faith on the part of the operators or is it an attempt to destroy the contract?

Trade Papers Optimistic

"It is true also that there is much idleness and slack work in this district. The miners feel it even more keenly than the operators. But it is not true that this district alone is affected, nor is it affected in greater degree than some of the adjoining districts. Even West Virginia, to which you constantly refer, has been and is far from operating steadily. If the optimism of the coal trade papers should be justified the condition of the industry would still be far from satisfactory because of the overdevelopment which makes slack work chronic.

"The solution you offer for the coal problem—a reduction in wages in this district—seems a simple one. But you are, or should be, just as fully aware of its real significance as are the miners. Should there be made in this district any wage concessions, the operators of all other districts signatories to the Jacksonville agreement would demand, and justly so, the same concessions. The non-union operators would promptly reduce wages still further, and the same relative positions between the districts would obtain. The only change accomplished would be that the miner would have still less money. There would be no more work.

"It is needless to say that District No. 2 is not willing to enter into a competitive wage war which could bring nothing more than increased poverty and desolation to the miner and his family. The early history of this district is replete with wage wars, and the results were always the same—added poverty and suffering for the miners and consequently their communities, and no gain for the operators. It is only since the wage contract has checked cut-throat competition that

Will Use Sulphur Gas To Make Ghost Walk

Men of the Coalton mine, at Nokomis, Ill., are looking for a supposed ghost which they say they have seen and that may be the cause of strange lights that appear and suddenly disappear around the mine. St. Louis detectives are looking for Frank Deverick, a former employee of the mine, who is alleged to have stabbed a companion to death in a St. Louis drinking party last spring. Deverick has not been seen since the tragedy and miners of a superstitious nature are inclined to think he may be dead and his spirit hiding in the mine. Officials of the mine are planning to use "sulphur gas" to smoke the ghost out.

even the slightest stability has been known in the coal industry.

"We, the Executive Board of District No. 2, therefore, reject as unsound your solution of the coal problem.

"You ask us what suggestions we have to make to relieve the union miners, the union coal operators and the business interests of the communities in which we reside.

"We reply: The nation consumes only enough coal to supply her needs. Were the miners to produce without pay coal in excess of that amount, the consumption would not increase. We are now supplying sufficient coal to meet all demands, yet work is slack and idleness is widespread in all bituminous districts. This is because there is a large overdevelopment in the coal industry.

"There is only one solution to this problem—the development of new coal fields and the opening of new mines must be checked until the demand and the supply counterbalance. Until this is done and not until then can you hope for substantial, permanent improvement in the bituminous coal industry."

Coal to the extent of 253,612 tons was used in the manufacture of explosives during 1923, according to figures issued by the Bureau of the Census. Similar figures on other industries are as follows: Coffins, burial cases and undertakers' goods, 78,503 tons; nets and seines, 2,833 tons; glass cutting, staining and ornamenting, 14,818 tons; china decorating, not done in potteries, 1,111 tons; sporting and athletic goods, 25,861 tons; straw hats, 21,647 tons; feathers and plumes, 291 tons; professional and scientific instruments, 24,288 tons.

Mayor Hylan Warns Against Coal Gougers in New York

To prevent suffering and discomfort among the poor of New York City this winter through lack of coal Mayor Hylan directed Health Commissioner Monaghan on Nov. 27 to take the usual steps to see that the poor receive coal this winter and that they are not made the victims of profiteers. The Mayor wrote:

"The cold weather, bringing greater demands for fuel, is the open season for profiteering by unscrupulous retail coal dealers. I feel that the Health Department could help considerably by a check-up of the retail coal dealers in this city, particularly the so-called cellar men. We have heard of no particular shortage of anthracite coal this year, but this is not likely to deter some of the retail dealers from charging exorbitant prices."

"The Mayor's Committee of Women have been carrying on splendid work for the last seven years, issuing priority tickets to the poor and insuring the delivery of small quantities of coal for home purposes. Their work of distribution would be greatly aided if there were some assurance that a proper supervision and regulation were maintained over prices. The Health Department might very properly undertake this work and call upon any other commissioner or department, such as Commissioner O'Malley of the Department of Public Markets, to help in the stabilization of the price of coal.

"Will you, therefore, proceed at this time to make such arrangements as will tend to prevent profiteering in this essential commodity so that the people who must depend upon the purchase of small bags of coal from cellar men and other dealers will not be forced to pay an excessive price to keep from freezing during the winter months."

Speed Return of Empties To Avert Car Shortage

Traffic officials of the various mining companies on the Louisville & Nashville Ry. system have been meeting with officials of the road to work out a helpful system of routing that would cut down the time on the return of empties for renewed service—this in view of obviating to the fullest extent possible car shortage during the winter. The plan is to leave intermediate routing open whenever possible and let the main routing take the course that will get the car home quickest.

More Coal Being Stored, Say Purchasing Agents

Notwithstanding the feeling in the coal industry that consumers were not storing coal during October, according to the monthly survey of the National Association of Purchasing Agents the amount of hard and soft coal in the bins of industrial consumers on Nov. 1 was 77,754,054 net tons as compared with 52,458,736 tons on Oct. 1, a gain of 25,285,343 tons. The survey shows that consumption during October increased by more than 1,200,000 tons over the September figures, the reports showing that the larger concerns are using more coal and the smaller firms an even greater increase than in September.

For heating industrial buildings during October the coal used was about 300,000 tons greater than in September.

It is estimated that on Nov. 1 there was sufficient coal in the hands of industrial users to last 66 days, based on the average daily consumption for October.

Alberta Coal Probe Halts for Collection of Data

After having been in session for a week, the commission recently appointed to make a survey of the coal industry in Alberta has taken one week's recess pending the arrival of certain information from various points in eastern Canada, the United States and England where similar investigations have been conducted in former years. According to H. M. E. Evans, chairman of the commission, there is much preliminary work to be done and non-contentious material to be gathered before witnesses will be heard, but it is hoped to begin taking evidence within a few weeks.

Broad powers have been conceded to the commission for the purpose of collecting accurate information in regard to every branch of the coal industry and these powers will be utilized to the full, it is announced. The scope of the inquiry, according to the original motion passed in the Provincial House last March, will include wages, housing conditions, profits made by companies, coal reserves, systems of mining, grading and inspection and all matters relating to marketing. This latter clause probably will include the matter of the Ontario and Manitoba markets for Alberta coal.

Owing largely to the big railway contracts having been postponed, production is slow among the steam coal mines in the province though the domestic mines are all working steadily. The Mountain Park Colliery has closed down until January, causing much distress among the miners who have been idle all summer owing to the strike. Other mines are working only short shifts until more orders can be obtained.

Prospects for next year, however, are bright and at least one company, the Luscar Collieries, Ltd., is preparing for an increase of business. A modern steel tipple capable of handling an output of 2,000 tons every eight hours is in process of erection in addition to a box loader, a new power plant and an extension to the siding.

Hayes Loses \$35,000 Suit to Vinton Collieries Co.

An echo of the miners' strike of 1922 in the central Pennsylvania coal field was heard from New York on Nov. 24, when Arthur Garfield Hayes lost his suit in court there against the Vinton Collieries Co., of Vintondale, Cambria County, for \$35,000 damages for alleged false arrest. Hayes was a prominent figure in the 1922 strike and a leader of the miners. When he attempted to hold a meeting in Vintondale he was placed under arrest and fined by a local justice of the peace. Returning to New York he entered suit against the collieries company, alleging false arrest and invasion of his constitutional rights. The case was tried before Judge Franks, who directed a verdict for the defendant company on several counts, passing several others to a jury for determination. The jury held the collieries company not guilty and the case was dismissed.

New Englanders Inspect Virginia Coal Mine

Some of the twenty New England business men who toured Virginia last month in the interest of commercial reciprocity, just before being taken in mine cars to inspect the Derby Shaft in southwest Virginia. The trip was arranged by the Virginia State Chamber of Commerce in the interest of closer trade relations between the mining interests of Virginia and the big consuming centers of the East and North. On the right hand side, sitting in the first car, are Dr. Joseph H. Smith, president of the Virginia State Chamber of Commerce; Clifford S. Anderson, president of the Associated Industries of Massachusetts; John W. Bray, general sales manager of the Bullard Machine Tool Co., of Bridgeport, Conn.; Romeo W. Miller, of the Bridgeport Crane Co., and Lee Long, vice-president of the Clinchfield Coal Corporation.



Rate Cut to Northwest in Effect Soon; Will Adjust 15c. L. & N. Differential

An agreement was reached before the Interstate Commerce Commission in Washington, Nov. 26, between representatives of the Norfolk & Western, the Chesapeake & Ohio and the Louisville & Nashville whereby the tariffs on coal for the Northwest which were to have become effective Dec. 5 and 6 will be withdrawn, but the lower rates to the Northwest will go into effect. The tariffs are to be withdrawn so as to allow an adjustment of the 15c. differential which the Louisville & Nashville has enjoyed.

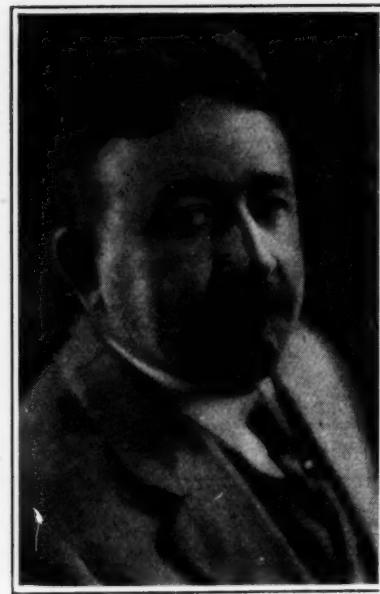
Representatives of the Western lines came home from Washington to carry out the positive suggestion made by the commission that they check out a new basis for joint through rates from Eastern mines to destinations in Western Trunk Line Territory. This rate check was to be held in Chicago Tuesday, Dec. 2. These new rates will be predicated to a large degree on the \$5.40 rate the commission found reasonable for L. & N. coal to the Twin Cities. This means that rates on eastern Kentucky and West Virginia coal will without doubt be somewhat increased to destination points on the Minneapolis & St. Louis, the Chicago Great Western and the Wabash, which previously have been enjoying low L. & N. joint through rates, but will be decreased on other lines. The exact method of determining these new rates has not been determined.

Instructive Program Planned For Engineers' Meeting

A program to aid the engineer in solving his problems, especially that of trimming operating cost, has been arranged for the fourth annual convention of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, to be held at the Frederick Hotel, Huntington, W. Va., Dec. 12 and 13.

The two-day meeting will open Friday morning, Dec. 12, when F. M. Reigher, electrical engineer, American Coal Co. of Allegany Co., Bluefield, W. Va., will present a paper, "Rotary Converters as Compared with Motor Generators." Another comparison will be made by N. A. Johnson, chief electrician, Buffalo-Eagle Coal Co., Braeholm, W. Va., who will discuss "Anti-Friction Bearings as Compared with Plain Type Sleeve Bearings for Mining Machinery." The remainder of this session will be devoted to open discussion on the following questions: "What Can Be Done to Prevent Theft of Rosettes, Lamps and Cord?" "How Should Mine Foremen Co-operate with Mine Electricians so That Both Can Be of Most Value to Their Company or Employer?"

In the afternoon meeting, Byron B. Minnum, of the Electric Storage Battery Co., Cincinnati, Ohio, will discuss "Voltage Control in Mines by Use of



John J. Lincoln

Treasurer, Pocahontas Coal Operators' Association, and general manager, Upland Coal & Coke Co., Elkhorn, McDowell County, W. Va.

Storage Batteries," and F. A. Singer, electrical engineer, Southern Mining Co.'s Interests, Williamsburg, Ky., will describe the "Electrical Department Methods of the Southern Mining Co."

The problem of trimming operating cost will be tackled in the Saturday morning session by J. H. Edwards, electrical engineer, associate editor, *Coal Age*, Huntington, W. Va., who will present a paper: "Reducing Cost by Proper Supervision of Mechanical and Electrical Equipment." After Mr. Edwards' talk the following questions will be presented for open discussion: "How Should Feeders Be Installed in Boreholes?" "What Important Repair Jobs Are Being Done by Electrical Welding?" "How Should Carbon Brushes Be Applied to Flush and Undercut Commutators?" The regular business meeting will conclude the morning program. In the afternoon the members of the association and their friends will inspect industrial plants of interest.

Coal Produced Per Man and Average Number of Days Worked Per Year by States in 1921, 1922 and 1923 (a)

	1921			1922			1923		
	Days Mine Worked	Average Tonnage Per Year	Per Day	Days Mine Worked	Average Tonnage Per Year	Per Day	Days Mine Worked	Average Tonnage Per Year	Per Day
Alabama....	166	487	2.93	215	647	3.01	232	680	2.93
Arkansas....	112	340	3.03	81	269	3.32	97	329	3.39
Colorado....	164	628	3.83	191	740	3.87	174	774	4.45
Illinois....	152	729	4.80	120	606	5.05	158	795	5.02
Indiana....	128	622	4.86	110	571	5.19	136	738	5.43
Iowa....	148	398	2.69	131	334	2.55	181	498	2.75
Kansas....	137	422	3.08	125	377	3.02	149	504	3.38
Kentucky....	152	625	4.11	140	684	4.89	152	735	4.83
Maryland....	120	392	3.27	101	318	3.15	178	608	3.42
Michigan....	196	516	2.63	162	429	2.65	222	593	2.67
Missouri....	166	415	2.50	113	326	2.88	155	477	3.07
Montana....	143	654	4.57	140	704	5.03	179	896	5.00
New Mexico....	150	536	3.58	216	779	3.61	216	708	3.28
North Dakota	194	813	4.19	175	769	4.39	182	837	4.60
Ohio....	134	617	4.60	100	492	4.92	150	742	4.95
Oklahoma....	141	380	2.70	114	356	3.12	133	398	2.99
Pennsylvania:									
Anthracite	271	567	2.09	151	349	2.31	268	592	2.21
Bituminous	151	609	4.03	154	592	3.84	213	882	4.15
Tennessee....	154	431	2.80	163	422	2.59	183	536	2.93
Texas....	139	336	2.42	185	389	2.10	178	484	2.72
Utah....	151	922	6.10b	204	1,057	5.18	160	1,077	6.73
Virginia....	166	628	3.78	198	779	3.93	212	832	3.92
Washington....	159	560	3.52	194	575	2.96	213	680	3.19
West Virginia	149	715	4.79	143	729	5.10	169	919	5.44
Wyoming....	167	849	5.08	128	659	5.15	192	1,004	5.23

(a) Compiled by U. S. Geological Survey. (b) See p. 647 of Coal in 1919, 1920 and 1921 for explanation of this figure, which though correctly computed is misleading.

New York Coal Exporters Charge Alien Plot

J. W. Stinson, attorney for Gano, Moore Co., coal exporters, of New York City, alleges that alien interests inspired the complaint of the Federal Trade Commission against the firm in a reply to the commission Nov. 25. Such aliens now are engaged in litigation with his clients, Mr. Stinson declared, and for that reason he contended that the commission is without authority to institute investigation "upon information or complaint of aliens in company with persons represented to be the friends of agents or of counsel of the commission, but in fact the undisclosed legal representatives of such aliens."

The commission's complaint had alleged that the Gano, Moore Co., Gano Moore Coal Mining Co., and M. Rea Gano, their president, violated contracts for the sale of coal to purchasers in Argentina, by delivering coal of an inferior quality to that specified, or failing to make deliveries of the proper quantities, under the contracts, "thereby tending to bring into disrepute and injuriously affect the entire exporting trade of the United States with and into the Argentine Republic."

Referring to a statement in the complaint that the United States has about three billion dollars invested in the merchant marine and that millions of dollars annually are appropriated out of the public treasury for the purpose of retaining and extending foreign commerce and trade, the Gano, Moore Co.'s attorney denied that this is relevant to the complaint and further denied influence arising from this allegation.

Wilful or negligent default from the terms of the contracts with Argentine purchasers also was denied on behalf of the respondents, and none was admitted except such as were beyond their control. "Full, reasonable and substantial performance ultimately has been given notwithstanding such circumstances and heavy loss to the respondents in pursuance of contracts whose mutual concensus imposes still unfulfilled obligations upon the purchasers," the commission was informed.

Hoover Asks Clear-Cut Ruling on Activities of Trade Associations; Reviews Work of His Department

Herbert Hoover, Secretary of Commerce, in his annual report, made public Nov. 27, appeals for clarification of the laws affecting trade association activities.

"It is imperative," said the Secretary in referring to trade associations, "that some definition should be made by which an assurance of legality in proper conduct can be had and by which illegality or improper conduct may be more vigorously attacked."

"Any collective activity can be used as a smoke screen to cover conspiracy against the public interest, but that is no reason for condemning all collective activities. Just because automobiles are sometimes used by bootleggers for the illegal transportation of liquor we do not prohibit their manufacture or their use."

Elimination of national waste is urged by Mr. Hoover. Under this heading he reviews the accomplishments of the department during the first three years of the present administration, notably in the field of unemployment, seasonal construction, coal, superpower, standardization, simplified practice, co-operative marketing and the reduction of housing costs.

Trade Bodies Cut Waste

In the section of the report dealing with trade associations Mr. Hoover says:

"One of the most important agencies through which the elimination of waste may be promoted is the trade association. It is true that a small minority of these associations have been in the past used as cloaks for restraint of trade by such activities as open-price associations and other attempts to control distribution or prices. It is equally true that the vast majority of trade associations have no such purpose and do no such things. The dividing line, however, between what activities are in the public interest and what are not in the public interest is not today clearly defined either by the law or by court decision."

"In consequence of recent decisions of the courts many associations are fearful of proceeding with work of vital public importance, and we are losing the value of much admirable activity. At the same time we are keeping alive the possibility of wrongful acts."

Turning to the bituminous coal industry the report says that investigations made early in the present administration revealed the high instability of this industry and the fact that it was functioning at great national loss. Of accomplishments in this field Mr. Hoover says:

"Through co-operation of trade associations of the principal industrial consumers, through chambers of commerce and public utilities a large amount of regular summer storage has been induced. Through the fine co-operation of the railways greater equipment and terminal facilities have been provided and car shortages have been largely

eliminated. Through co-operation by the department with the unionized operators and with the leaders of the United Mine Workers a long term agreement has been entered upon, which insures industrial peace in the industry."

The program of the Northeastern superpower committee, under Mr. Hoover's chairmanship, is discussed as another effort in the direction of waste elimination.

Mine Guard System Enjoined By West Virginia Court

An injunction against employment of "mine guards" by Don Chafin, Sheriff of Logan County, West Virginia, was issued Nov. 22 by Judge A. P. Hudson, of the Kanawha County Circuit Court.

Besides Sheriff Chafin, the injunction is directed against Circuit Court Judge Robert Bland, of Logan; Prosecuting Attorney John Chafin, of Logan; W. F. Farley, Johnson Queen and P. M. Toney, the Logan County commissioners; C. L. Estep, Assistant Prosecuting Attorney, approximately 250 deputy sheriffs and about 50 Logan County coal companies.

The order restrains the Sheriff, County Court and other officials from appointing deputies to act as watchmen for private individuals or corporations, and restrains the coal companies from paying money directly or indirectly to the deputies for any services to coal companies or to Sheriff Chafin.

Indiana Consolidation Talk Is Revived

The long-discussed movement to consolidate the coal mines of District No. 11, which includes the entire Indiana bituminous coal field, is being considered again by the coal operators about Terre Haute. Reports of such a movement have been current for several months, but it is evident that the effort has been somewhat accelerated recently by the general hard time which the whole state has met.

The plan is said to provide for the consolidation of all the shipping mines in the state, numbering approximately 125, and is considered with the view to reducing the cost of production and thereby arming the industry in the state with more power and ability to meet competition, which it seems it is utterly unable to do at the present time.

"I have no definite knowledge regarding such a movement," said Phil. H. Penna, secretary of the Indiana Bituminous Coal Operators Association, "but I do know in a general way that the consolidation of the mines of the Indiana field, or perhaps the forming of several consolidations, is being considered by some of the operators. The plan is very desirable, and must be effected if we expect to remain in business."

At present the Indiana mines are producing only about 35 per cent of their potential capacity. Every oper-

Lewis' Strength Slipping In West Kentucky

It is reported from Central City, Ky., that the Oakland Coal Mining Co., which had been operating in a limited way for a week or so on the 1917 wage scale, succeeded last week in getting its workers to sign up on a local union basis, the men breaking away from the United Mine Workers, as was the case in Webster, Hopkins, Union and Henderson counties. In the Muhlenburg County field, around Central City, the Oakland is the first mine to operate since April 15. The Gibraltar Coal Mining Co. has been cleaning up and getting ready to operate and others probably will start soon, which makes it appear as if the régime of the United Mine Workers in western Kentucky is nearing an end.

It is reported that more than one hundred men started work for the Oakland company last week.

ator is continuing with the hope that conditions will improve. Under a state-wide consolidation a great many mines not being operated at present and which are a burdensome expense would be abandoned or indefinitely closed, and only those mines which are necessary to supply the demand would be operated. Co-operative buying and selling would be counted on to reduce expense.

Two similar movements toward consolidation have been talked of in the Illinois mining districts, according to reports received in Terre Haute. Thirty-five mines in the Belleville district are said to be involved in one negotiation and the other scheme includes a number of operations in central Illinois.

Orders Pittston Strikers to Work or Lose Charters

Scranton, Pa., Dec. 2.—D. W. Davis, international organizer of the United Mine Workers, yesterday called a meeting of District 1 executive board, at which it was decided to give the 12,000 miners of the Pennsylvania Coal Co. engaged in an outlaw strike until Wednesday to return to work before revoking the local union charters.

John L. Lewis, international president of the mine workers, evidently has become weary of complaints from anthracite operators that the contract between the operators and the union is being continuously broken by unauthorized strikes over alleged grievances. He evidently suspects what is taken for a general fact in the anthracite region, that the strikes are just as much a piece of union politics against the presiding district officials as a protest on conditions at the mines. Lewis' attitude was expressed late last week in a telegram ordering the district officials to turn over their problems to Mr. Davis, an Illinois man.

What attitude the Pennsylvania Coal Co. strikers will assume in face of the threat issued by the district board remains to be seen, but it is not expected to bring the strike to an end.

Program to Eliminate Waste of Wood May Presage Better Mining Methods

Coal Industry Encourages Plan to Conserve Forest Products—Decline in Use of Wood for Fuel Promises New Outlet for Coal—Economies in Improved Machinery

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

The Washington conference on utilization of forest products emphasized the fact that the coal industry has a selfish as well as an altruistic reason for encouraging the research program which aims to eliminate waste of wood. This includes, of course, the utilization of waste for higher purposes when that is possible. The time practically is past when any large portion of so-called forest waste is burned simply to get rid of it. Large amounts of it, however, are being used as fuel.

Higher uses, it was contended at the conference, can be found even for sawdust. Wood fiber lends itself admirably to the making of paper. It was revealed at the conference that a means has been perfected whereby the less valuable American hardwoods can be converted into newsprint paper, a product for which our requirements are large and which now is largely imported. The manufacture of kraft paper from Southern pine of itself in recent years has become a great industry. With the use of paper packing boxes becoming general a great market is being established for container board. The insulating properties of dead air cells have even built up a market for "synthetic" lumber, which consists of boards rolled from a pulp made from timber waste.

The advance already made along these lines, with the comprehensive research program now planned, promises to reduce still further the amount of wood available for the production of energy and heat. Many overlook the extent to which wood is a competitor of coal. In 1922, according to Forest Service figures, 100,000,000 cords of wood were used by the United States. This is equivalent to 60,000,000 tons of coal.

Much Wood Still Used as Fuel

Sight frequently is lost of the fact that wood was the principal fuel in the United States until 1880. In that year 140,000,000 cords were used, or the equivalent of 90,000,000 tons coal. In the forty-five years since that time it has held on tenaciously and, as stated, still is displacing coal to the extent of some 60,000,000 tons. For the reasons mentioned, however, a much more rapid decline in its use may be expected in the future with something of a windfall to the coal industry, which eventually will absorb most of the 60,000,000 tons—an item of new business which will not be sneezed at.

In the whole forest products conference there was much of interest to coal, in that the steps now being taken to conserve wood eventually will be taken to conserve coal. In its development coal is a generation or more behind the lumber industry. A genera-

tion or two ago forests were so extensive that waste came in for little consideration. It was induced on every hand by cutthroat competition. Some of the very men who had no patience with the Roosevelt-Pinchot plea for conservation, voiced in 1907, were leaders in this recent forest products meeting and are strongly behind the conservation of our forest resources from the trees in the woods to the use of the board by the carpenter who nails it in its final place. They even went further and are urging that the board be protected from decay after it has been placed in final use.

Coal operators in their present state of mind have no great interest in preventing wastes in mining or other avoidable losses, particularly if it adds anything to the cost of production, but if forest products furnish a proper criterion the day is not distant when more is going to be heard of the elimination of waste in coal.

Economies of Machinery

A union in the height of its power might block a move to utilize roof coal in the Pittsburgh bed, but it might be more conciliatory today when the Pittsburgh operators are so hard pressed in the competitive struggle. The common defense of waste in mining is that the competitive situation is such that full utilization of mine resources is not practicable. It is certain that definite limits exist as to the amount of coal which can be mined, but by using the latest mechanical appliances, under close supervision, it is known that much less coal can be left unmined than usually is the case. Not only that; it has been demonstrated that such a course results in economies which before had not been considered.

Employment of mechanical equipment in the larger scale operations cuts down the time required to work out a given area and reduces the fracture caused by subsidence. The coal industry has not reached the point where it is catching at every straw that suggests an opportunity to lessen waste, but if experience in the lumber industry is duplicated each passing year will see more and more pressure brought to save the maximum amount of a great resource.

Systematic Research Advisable

In fact the coal industry might be forewarned by the experience in some other industries and undertake more systematic research before such a program is forced upon it. The nitrate producers of Chile, for instance, have gone along blithely for many years mining their product in an antiquated manner and with little regard for the economies of better practice. The synthetic nitrogen industry began to

Ford Moves Coal Records By Wagon Train

Although Henry Ford, the flivver king, has built millions of automobiles and has money enough to command any known means of transportation, when he found it necessary to move the records of the Fordson Coal Co. from the Redbird operation at Pineville, Ky., to the little community of Annalee, in the heart of the Cumberland Mountains, he had recourse to a wagon train to negotiate the twenty miles.

Whether the transfer meant the early opening of Ford holdings in the mountains could not be verified by officials, who said the move had no special significance.

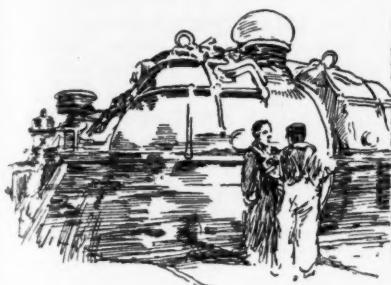
The equipment will be taken to Garrard Station by train and then loaded on a wagon for the twenty-mile trip over the trail to Annalee.

There has been much talk of a railroad to be built by the Ford interests into the heart of the mountain properties, but these reports have always been denied by those in authority.

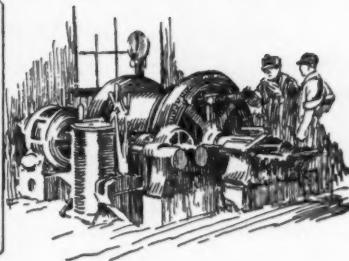
develop. It had a small beginning and its growth has been at isolated plants scattered throughout the world. The Chilean producers gave little heed, as they felt certain no manufactured product could compete with a great natural resource. Within a year, however, they have been confronted with an aggregate production from many small plants which has cut heavily into their market. At a meeting of these producers in Chile recently the situation was appraised in its significance and a pretentious research program authorized. This is only one example of a general trend. Even industries that are not hard pressed are finding that investments in research pay big dividends.

Nova Scotia Miners Prepare To Demand Higher Wages

Wage demands to be made by the executive officers of District 26, United Mine Workers (Nova Scotia), in negotiating with operators for a new agreement were decided upon at the miners' convention at Sydney, N. S., on Nov. 21. They will ask 25 per cent increase for datal men, 10 per cent increase for contract workers; 10 per cent additional increase for all miners working on night shift or two-shifted places, and a 15 per cent increase for all three-shifted places. The opinion expressed during the discussion was that companies should do away with the double and triple shifts and that the only way to effect this was to force up operating costs by demanding high wages for the men employed in these places. The convention adopted a resolution to the effect that the Executive Board use its influence with the British Empire Steel Corporation and the Department of Mines to have all mines now working continue to operate, failing which "direct action" will be taken by the district.



Practical Pointers For Electrical And Mechanical Men



Explosion Cannot Injure This Mine Fan

Weak Section Built in Air Duct Acts as Safety Valve
—Auxiliary Doors Cover Blown Out Section in Air-Way and Ventilation System Is Quickly Restored

Records compiled by the U. S. Bureau of Mines show conclusively that in the event of an explosion or mine fire, if the fans can again be quickly put in service, damage to the mine and injury to the workmen may be greatly reduced.

At the J. K. Dering Coal Co. mine near Eldorado, Ill., an old hoisting shaft is now used as an airway. The fan house is built adjacent to the old shaft, and a concrete duct connects the fan to the shaft. An interesting feature about this airway is that part of it is constructed of light wood boards which have been covered with a thin layer of cement to make them airtight. Should an explosion occur, this section is expected to act as a safety valve. The force of the explosion will probably blow out the boards and thus relieve the fan from the full force of the blast.

In such an event, if it is desirable, as it usually is, to get the fan in operation, the auxiliary sheet-iron doors hinged to the edge of the weak section in the airway, which have hitherto been left open, may be closed, repairing the breach that the explosion has caused. The facility with which this operation can be performed makes this provision of unusual value. The illustration shows a diagrammatic sketch of the airway, fan and airshaft. Fig. 1 shows the doors raised for the purpose of ex-

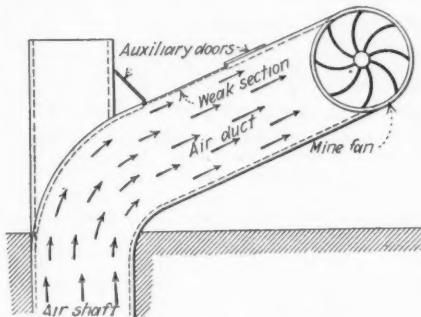


Fig. 2—Mine Fan with Relief Section

An explosion in the mine ventilated by this fan would no doubt blow out the weak section of the air duct, which has been arranged to relieve the fan of the full force of the explosion.

hibiting their location on the fan duct. It is possible to close both of these doors just as soon as any part or the whole of the weak portion of the airway is blown out.

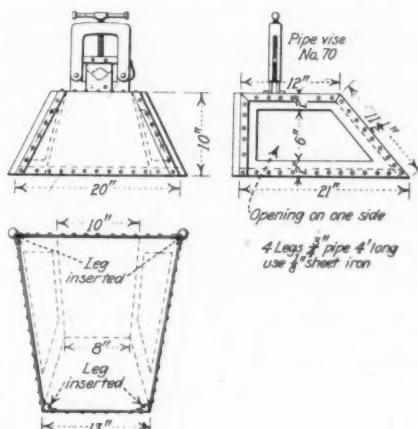
Portable Pipe Vise, Another Time Saver

Running conduit in a breaker may be made a hard job or an easy one according to the way in which it is handled. At Hazleton Shaft Colliery, of the Lehigh Valley Coal Co., new

construction made necessary the tearing out of some of the old lighting lines faster than replacements could be made. The need for lights made it essential that the work be speeded up, and the question was raised as to the cause for the slow progress.

An investigation located the trouble easily. The method previously used was to strap a pipe vise on whatever beam was handiest. As the conduit line advanced, the vise had to be moved to another beam and fastened to it. This consumed much time, because, if there was no beam handy, the vise had to be taken back to the old set-up which in some cases was some distance away. More than once the vise disappeared over night or over the week end, because being so readily portable someone had borrowed it and then had failed to put it back in its place.

In order to avoid these difficulties, a sheet-metal body was constructed ar-



Portable Pipe Vise Easily Made

All the necessary fittings for a conduit construction job are carried with this one-man vise and stand.

ranged for the reception of four pipe legs. The pipe vise was permanently mounted on the top of this body, forming a portable, one-man equipment, complete and ready to be set up anywhere desired. Underneath the vise is a pocket which holds a collection of conduit fittings, a can of white lead, pipe straps, nails, etc., necessary in making a conduit installation. When the vise is moved, the small tools and parts are carried with it.

The sketch gives a fair idea of how this handy tool was constructed, and anyone who can make use of the contrivance is welcome to build one like it.

JOHN FRANCIS,

Hazleton, Pa. Electrician.
Employees' Magazine Lehigh Valley Coal Co.

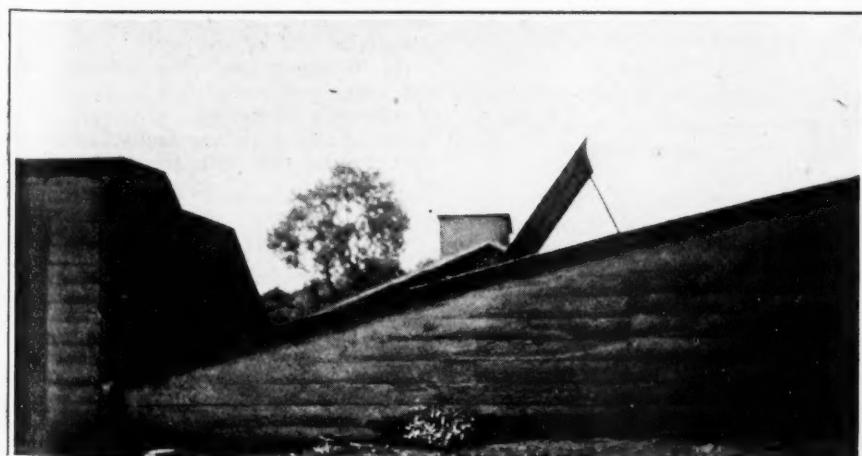


Fig. 1—Sheet-Iron Fan Doors Ready to Be Closed

By closing the sheet-iron doors the damaged part of the airway may be quickly sealed off and the fan started after an explosion. Even greater protection would have been afforded had a somewhat larger weak section been placed in the direct line of the shaft. Probably some reason not apparent prevented a choice of this position.

Put Sand in the Boxes and Not in the Bearings

Sand, dust and dirt cause more damage to bearings in a few minutes than months of ordinary wear. Mine locomotives are built close to the ground, and consequently axle bearings and motors soon become covered with dirt and fine road dust.

Even though it is necessary to sand mine rails, the practice has its disadvantages. The sand is easily picked up by the motor wheels and dropped on the bearings. However, this cannot be avoided, but with care the sand that usually enters the bearings when the sand boxes are being filled can be prevented from so doing.

At some mines an extra supply of sand is carried on the locomotive so that if the sand boxes are emptied they can be promptly filled even though the locomotive may be a long distance from the sand bin.

STOP LEAKAGE OF SAND

Sand which is carried on the top of a locomotive sooner or later leaks and gets into the bearings. Therefore, this practice should be discouraged.



Handy Scoop Prevents Sand from Spilling on Bearings

It is easy to shoot sand into locomotive sand boxes when this device is used. Sand that gets into the bearings grinds them out and increases maintenance costs.

On some locomotives the holes for the sand boxes are so located that it is difficult to fill them without spilling sand on the ground or on parts of the locomotive. The sketch shows a handy scoop with two handles. This accessory makes it easy to dig into the sand pile and facilitates filling the boxes. It is both a bucket and a chute, and when used prevents sand from getting in the axle bearings.

Battery-Locomotive Meter Put in Negative Line

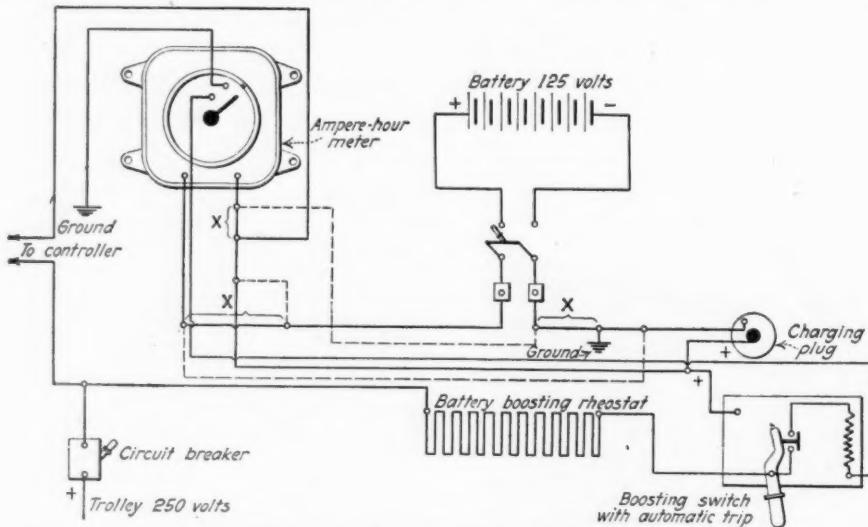
Trouble with ampere-hour meters on our combination battery-and-trolley locomotives has been greatly reduced by a simple change in the wiring. These locomotives are equipped with 180-volt motors which are supplied with 250 volts when operating from the trolley and with 125 volts when operating from the battery. The change from one voltage to the other is made by connections on the reverse cylinder of the controller. The fact that these are combination locomotives makes it necessary to have the negative wiring grounded to the frame as with the ordinary trolley-type locomotive.

As originally received these locomotives had the meter connected in the positive side of the battery circuit.

This arrangement, together with the permanent ground of the negative to the frame, caused a difference of potential between the wiring in the meter and the meter case of 100 to 150 volts. It frequently happened that the meters were severely damaged by arcs to the ground, the arcs generally being caused by the meter cover while being removed coming in contact with the meter windings. Changing the wiring so as to place the meter in the negative line, has entirely eliminated this trouble.

CHANGED ORIGINAL CONNECTIONS

The original wiring is indicated by the full lines in the accompanying drawing. The scheme of the revised wiring, placing the meter in the negative, is indicated by the additional dotted lines and by the marks X which denote that certain wires were cut.



Meter Shifted to Negative Line Prevents Damage

To make this change required cutting the old wiring in three places, shown at X, and making additional connections illustrated by the dotted lines. Now the difference of potential between the meter circuits and the meter case is so low that insulation breakdowns and short circuits are almost impossible.

Before the change an average of six meters per year, from the five combination locomotives in use, were damaged by grounds. The position of the meters was changed to the negative conductor over two years ago and since that time not one of the meters has been damaged by grounding or internal arcing.

R. R. WEBSTER,
Master Mechanic,
Elkhorn Piney Coal Mining Co.,
Weeksbury, Ky.

How to Weld Cast Iron with A Self-Fluxing Electrode

An electrode has been devised by the General Electric Co., and will be described in the New Equipment section soon, which consists of a metal core surrounded by a suitable coating of flux, the whole being provided with a sheath so that the operative has in the metallic rod all the material for the making of the weld except the torch and tanks. The method of using such electrodes is as follows:

(1) The electrode should be held at right angles to the work, maintaining a short arc, except when it is difficult to fuse the metal properly, which is due to what is commonly called a hard or sandy condition in the base stock. When this occurs the arc should be lengthened temporarily to afford the desired fusion.

(2) The arc should travel in a direct line along the seam when welding thin parts, and be moved back and forth across the joint on heavier parts. The arc should never be vibrated or weaved to and fro as is the practice when using ordinary base electrodes.

(3) The fact that the welding electrode fuses more rapidly than other electrodes should not encourage rapid travel. Slow travel tends to avoid rapid cooling and thus produces softer and sounder welds. The flux coating deposited by the electrode also materially assists in retarding the rates of cooling.

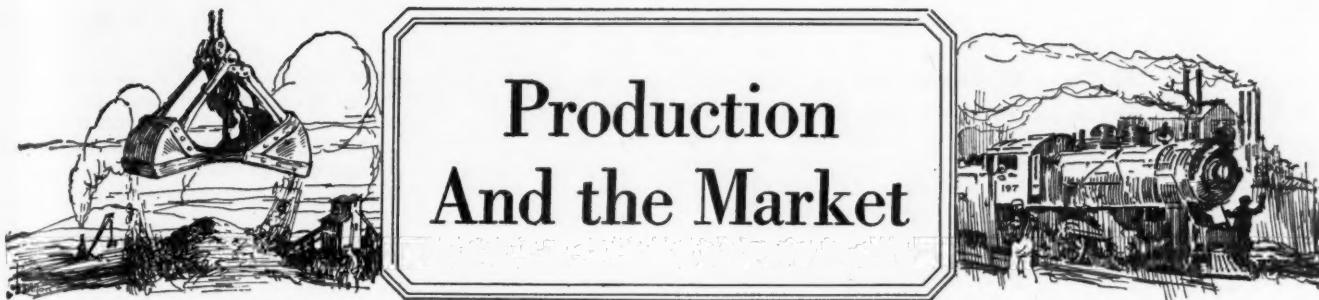
(4) Where practicable, the weld should be completely filled in one continuous deposit rather than in successive layers. In welding heavy V'd parts, the V should be completely filled from bottom to top during the advance along the line of the weld.

(5) To insure against slag inclusions, any accumulations of flux scale may be occasionally removed, although thin layers of this scale are easily fused and float to the top with the slow travel of the arc.

Current Values for Various Sizes of Electrode

Diameter Electrode in In.	Current in Amp.	Diameter Electrode in In.	Current in Amp. Up to
$\frac{1}{8}$	50 Up to 110	$\frac{1}{4}$	140 180

Suitable current values for the various sizes of electrode are given in the accompanying table. For some purposes current values greater than those herein mentioned may be used to advantage.



Production And the Market

Spottiness Characterizes Soft-Coal Market; Anthracite Business Easier

Spottiness continues to characterize the coal business of the country. A taste of winter weather in the Middle West has given stimulus to domestic demand, but the supply is more than sufficient to meet all requirements. In Kentucky and Ohio, however, a return of mild temperature has brought about a weakening tendency, which has been intensified by the virtual close of lake shipping. There is a slight improvement in West Virginia for both steam and domestic grades. The Pittsburgh market has sagged again after several weeks of gradual upturn. The Atlantic seaboard as well as the Southwestern markets are holding to a fairly even keel, marked neither by high lights nor dark shadows. New England is in the throes of a dull period from which there is no immediate prospect of relief.

In most sections steam coal is moving largely on contract, and consumers are taking comparatively small quantities. Those not parties to agreements are jogging along on the old hand-to-mouth scheme, reassured by the weather, the volume of output and continued good performance by the railroads. Despite the heavy grain movement there has been practically no car shortage, but some easy-going consumers may have overlooked the developments that probably would follow in the wake of a snowstorm or a real cold wave.

Anthracite Business Featureless

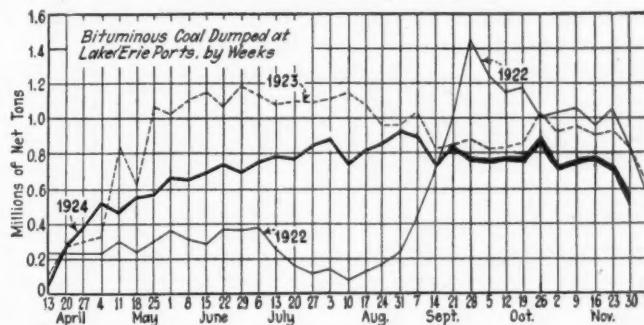
A somewhat complacent attitude marks the anthracite trade, consumers being disposed to take things easy. Shipments have been irregular because of intermittent outlaw strikes at the mines, but independent quotations have not been much affected. In general the call for stove has been in excess of the supply, though Philadelphia shows a preference for nut. Egg moves only moderately well, but pea is sluggish. Steam coal shows medium activity, buckwheat being somewhat improved and rice and barley a little easier.

Coal Age Index of spot prices of bituminous coal

advanced one point last week, standing on Dec. 1 at 171, the corresponding price for which is \$2.07.

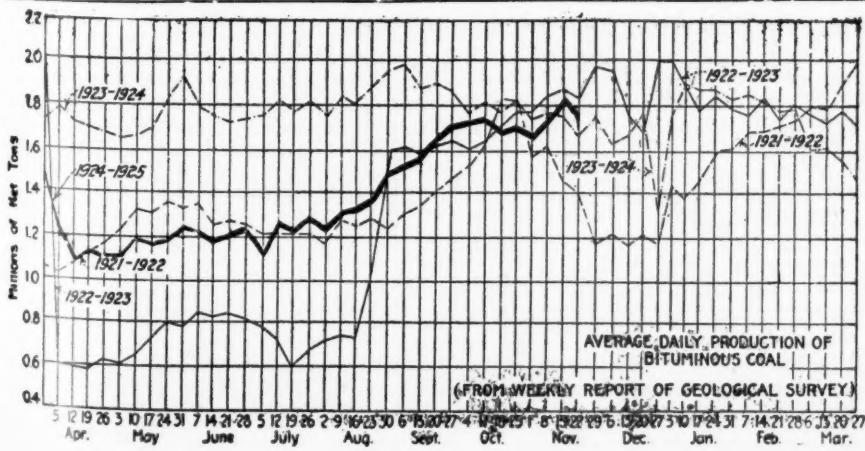
A pronounced slump marked activity at Hampton Roads last week, dumpings of coal for all accounts for the seven-day period ended Nov. 27 totaling 299,555 net tons, compared with 369,793 tons the week before.

The lake navigation season practically came to an end last week, when dumpings at Lake Erie ports up to and including Nov. 30, according to the Ore & Coal Ex-



change, were as follows: For cargo, 562,467 net tons; for fuel, 20,802 tons, compared with 704,930 and 28,698 tons respectively during the preceding week.

There is not much change in the daily rate of production of bituminous coal, for although the total output for the week ending Nov. 22, according to the Geological Survey, was 10,588,000 net tons, an increase of 459,000 tons over the preceding week, the lower figure for that week was due to the partial observance of Armistice Day. It is interesting to note, however, that this is the second time that output has exceeded that of the corresponding week of 1923. Anthracite production in the week ended Nov. 22 totaled 1,827,000 net tons, compared with 1,674,000 tons in the previous week and 2,031,000 tons in the corresponding week of last year. Local strikes have been limiting hard-coal output.



Estimates of Production

(Net Tons)

BITUMINOUS

	1923	1924
Nov. 8.....	10,726,000	9,331,000
Nov. 15 (a).....	9,717,000	10,129,000
Nov. 22 (b).....	10,160,000	10,588,000
Daily average.....	1,693,000	1,765,000
Cal. yr. to date (c).....	495,428,000	413,574,000
Daily av. to date.....	1,795,000	1,498,000

ANTHRACITE

	1923	1924
Nov. 8.....	1,903,000	1,592,000
Nov. 15.....	1,669,000	1,674,000
Nov. 22.....	2,031,000	1,827,000

COKE

	1923	1924
Nov. 15 (a).....	254,000	149,000
Nov. 22 (b).....	257,000	158,000
Cal. yr. to date (c).....	16,640,000	8,608,000

(a) Revised since last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

Midwest Is Colder Now

Some improvement in a sagging domestic market was felt throughout the Midwest during the week because of the snappy weather. There were no price changes worthy of note, however, except in Standard screenings because the supply always is so ready to meet and overwhelm the demand. This situation explains why not all the lump and egg coal standing unbilled on wheels in Illinois and Indiana has been shipped. Steam business throughout those two states is only fair. Too many mines have reopened lately for the good of the market.

Railroad business from Illinois mines is easy, a few roads taking a little coal. Strip mines continue to show good production and are selling at what the market will bring and usually are in competition with the low prices of the non-union west Kentucky field. Cars are plentiful and mines are getting from two to four days a week.

Mt. Olive is still slow in domestic and mines are getting but two and three days a week; those working three are loading railroad coal. Steam is going mostly on contract. In the Standard field there has been an advance in the price of screenings, which is now \$1@\$1.15. Everything else from that field is dragging.

Seasonable weather in St. Louis has created a little domestic demand for middle grade coal. The weather as yet has not brought the demand for Standard that it will later.

There is practically no anthracite, smokeless or coke moving, and this is discouraging. The only answer is that people who usually buy this kind of coal have not bought it thus far and will not because they have oil burners. Local wagonload steam is fairly good and carload is slow. Country demand for steam is nil and country domestic is good in spots only.

Kentucky Business Is Spotty

Further weakness has appeared in the Kentucky market for prepared coal over the week due to lack of ready demand on account of warm weather and slow buying tactics of consumers and retailers. Steam prices remain unchanged, with both eastern and western Kentucky quoting screenings at 85c@\$1 and mine run \$1.50@\$1.75, some houses asking as high as \$1.85 for mine run. In western Kentucky lump sizes are weaker, block being offered at \$2.75@\$3; lump, \$2.40@\$2.75; egg, \$2.25@\$2.75; nut, \$1.60@\$2.10. In eastern Kentucky 4-in. block is \$2.75@\$3.25; lump, \$2.25@\$2.75; egg, \$1.90@\$2.25; nut, \$1.60@\$1.90.

General conditions are good and Kentucky has been getting a good volume of business considering other fields and weather conditions. It also is believed that over winter volume will be greater than in past seasons, due to the fields being favored by low production cost on the non-union basis and ability to absorb freight rates, etc., and get into territory usually served by union mines to the north.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

	Market Quoted	Dec. 3 1923	Nov. 17 1924	Nov. 24 1924	Dec. 1 1924†		Market Quoted	Dec. 3 1923	Nov. 17 1924	Nov. 24 1924	Dec. 1 1924†
Low-Volatile, Eastern						Midwest					
Smokeless lump.....	Columbus.....	\$4.10	\$4.10	\$4.25	\$4.00@ \$4.25	Franklin, Ill. lump.....	Chicago.....	\$4.10	\$3.35	\$3.35	\$3.25@\$3.50
Smokeless mine run.....	Columbus.....	2.10	2.00	2.00	1.75@ 2.00	Franklin, Ill. mine run.....	Chicago.....	2.35	2.35	2.35	2.25@ 2.50
Smokeless screenings.....	Columbus.....	1.30	1.25	1.25	1.20@ 1.35	Franklin, Ill. screenings.....	Chicago.....	1.55	1.35	1.45	1.35@ 1.60
Smokeless lump.....	Chicago.....	4.10	4.10	3.85	3.75@ 4.25	Central, Ill. lump.....	Chicago.....	3.10	2.85	2.85	2.75@ 3.00
Smokeless mine run.....	Chicago.....	2.00	1.85	1.85	1.75@ 2.00	Central, Ill. mine run.....	Chicago.....	2.10	2.20	2.20	2.15@ 2.25
Smokeless lump.....	Cincinnati.....	3.10	3.75	4.00	3.75@ 4.25	Central, Ill. screenings.....	Chicago.....	1.35	1.25	1.30	1.25@ 1.35
Smokeless mine run.....	Cincinnati.....	2.00	1.85	1.85	1.75@ 2.00	Ind. 4th Vein lump.....	Chicago.....	3.35	3.10	3.10	3.00@ 3.25
Smokeless screenings.....	Cincinnati.....	1.35	1.15	.95	.75@ 1.15	Ind. 4th Vein mine run.....	Chicago.....	2.60	2.35	2.35	2.25@ 2.50
*Smokeless mine run.....	Boston.....	4.60	4.30	4.25	4.20@ 4.35	Ind. 4th Vein screenings.....	Chicago.....	1.55	1.45	1.55	1.50@ 1.60
Clearfield mine run.....	Boston.....	1.85	1.90	1.95	1.70@ 2.25	Ind. 5th Vein lump.....	Chicago.....	2.50	2.85	2.75	2.50@ 3.00
Cambridge mine run.....	Boston.....	2.50	2.30	2.30	2.00@ 2.60	Ind. 5th Vein mine run.....	Chicago.....	2.10	2.10	2.10	2.00@ 2.25
Somerset mine run.....	Boston.....	2.10	2.05	2.05	1.80@ 2.35	Ind. 5th Vein screenings.....	Chicago.....	1.30	1.10	1.20	1.10@ 1.35
Pool 1 (Navy Standard).....	New York.....	3.00	2.75	2.80	2.65@ 3.00	Mt. Olive lump.....	St. Louis.....	3.10	3.00	3.00	3.00
Pool 1 (Navy Standard).....	Philadelphia.....	3.00	2.70	2.70	2.50@ 2.90	Mt. Olive mine run.....	St. Louis.....	2.25	2.35	2.35	2.25@ 2.50
Pool 1 (Navy Standard).....	Baltimore.....		2.30	2.30	2.10@ 2.50	Mt. Olive screenings.....	St. Louis.....	1.25	1.10	1.10	1.00@ 1.25
Pool 9 (Super. Low Vol.).....	New York.....	2.35	2.10	2.10	2.00@ 2.25	Standard lump.....	St. Louis.....	3.05	2.75	2.75	2.75
Pool 9 (Super. Low Vol.).....	Philadelphia.....	2.30	2.15	2.15	1.95@ 2.35	Standard mine run.....	St. Louis.....	2.05	1.95	1.95	1.90@ 2.00
Pool 9 (Super. Low Vol.).....	Baltimore.....	2.05	1.70	1.70	1.65@ 1.80	Standard screenings.....	St. Louis.....	.55	.65	.65	1.00@ 1.15
Pool 10 (H.Gr. Low Vol.).....	New York.....	2.00	1.85	1.85	1.65@ 2.00	West Ky. lump.....	Louisville.....	3.00	3.05	3.00	.75@ 3.00
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	1.85	1.75	1.75	1.65@ 1.90	West Ky. mine run.....	Louisville.....	1.70	1.60	1.60	1.50@ 1.75
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	1.90	1.55	1.55	1.50@ 1.65	West Ky. screenings.....	Louisville.....	.70	.80	.90	.85@ 1.00
Pool 11 (Low Vol.).....	New York.....	1.65	1.60	1.60	1.50@ 1.75	West Ky. lump.....	Chicago.....	2.85	2.75	2.75	2.50@ 3.00
Pool 11 (Low Vol.).....	Philadelphia.....	1.70	1.45	1.45	1.35@ 1.60	West Ky. mine run.....	Chicago.....	1.75	1.55	1.55	1.40@ 1.70
Pool 11 (Low Vol.).....	Baltimore.....	1.75	1.45	1.45	1.40@ 1.50						

High-Volatile, Eastern

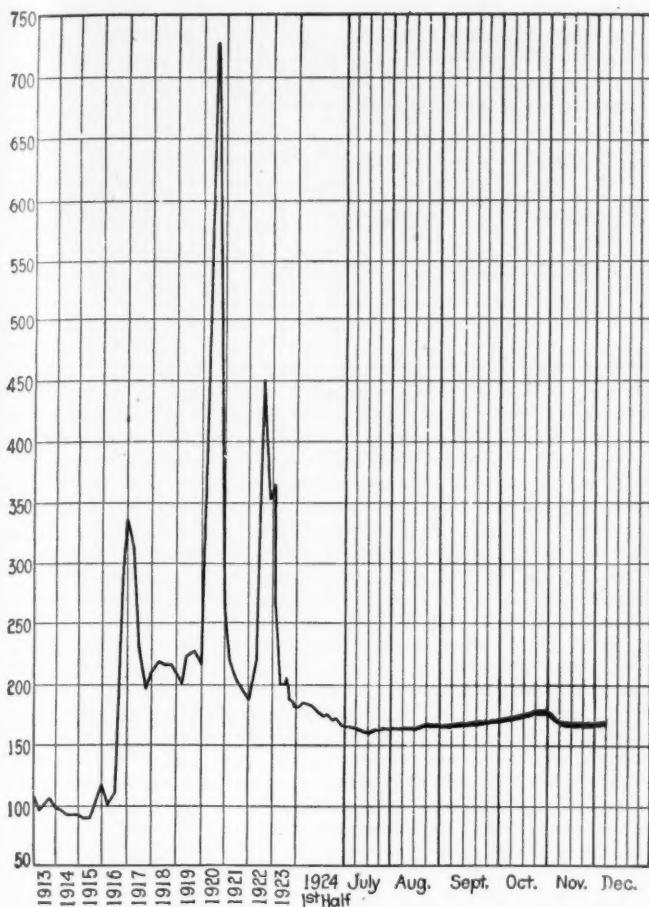
Pool 54-64 (Gas and St.).....	New York.....	1.60	1.50	1.50	1.40@ 1.65	Big Seam lump.....	Birmingham.....	3.85	3.10	3.10	2.75@ 3.50
Pool 54-64 (Gas and St.).....	Philadelphia.....	1.65	1.50	1.50	1.40@ 1.60	Big Seam mine run.....	Birmingham.....	1.95	1.70	1.70	1.50@ 1.90
Pool 54-64 (Gas and St.).....	Baltimore.....	1.70	1.45	1.45	1.40@ 1.50	Big Seam (washed).....	Birmingham.....	2.35	1.85	1.85	1.75@ 2.00
Pittsburgh sc'd gas.....	Pittsburgh.....	2.55	2.40	2.40	2.30@ 2.50	S. E. Ky. lump.....	Chicago.....	3.10	2.75	2.75	2.50@ 3.00
Pittsburgh gas mine run.....	Pittsburgh.....	2.25	2.10	2.10	2.00@ 2.25	S. E. Ky. mine run.....	Chicago.....	1.85	1.60	1.60	1.50@ 1.75
Pittsburgh mine run (St.).....	Pittsburgh.....	2.00	1.85	1.85	1.75@ 2.00	S. E. Ky. lump.....	Louisville.....	3.35	3.25	3.00	2.75@ 3.25
Pittsburgh slack (Gas).....	Pittsburgh.....	1.30	1.15	1.15	1.15@ 1.25	S. E. Ky. mine run.....	Louisville.....	1.75	1.60	1.60	1.50@ 1.75
Kanawha lump.....	Columbus.....	3.00	2.55	2.55	2.10@ 2.50	S. E. Ky. screenings.....	Louisville.....	.80	.95	.90	.85@ 1.00
Kanawha mine run.....	Columbus.....	1.85	1.55	1.55	1.45@ 1.65	S. E. Ky. lump.....	Cincinnati.....	3.00	2.75	2.75	2.50@ 3.00
Kanawha screenings.....	Columbus.....	.80	.95	.90	.80@ 1.00	S. E. Ky. mine run.....	Cincinnati.....	1.50	1.45	1.45	1.35@ 1.65
W. Va. lump.....	Cincinnati.....	2.75	2.65	2.55	2.75@ 3.00	S. E. Ky. screenings.....	Cincinnati.....	.65	.95	.95	.85@ 1.20
W. Va. gas mine run.....	Cincinnati.....	1.50	1.45	1.40	1.30@ 1.60	Kansas lump.....	Kansas City.....	5.10	5.00	5.00	4.50@ 5.00
W. Va. steam mine run.....	Cincinnati.....	1.50	1.35	1.40	1.30@ 1.60	Kansas mine run.....	Kansas City.....	3.25	3.35	3.35	3.25@ 3.50
W. Va. screenings.....	Cincinnati.....	.50	.95	1.00	.80@ 1.20	Kansas screenings.....	Kansas City.....	2.00	2.00	2.30	2.25@ 2.35
Hocking lump.....	Columbus.....	2.95	2.55	2.55	2.35@ 2.75						
Hocking mine run.....	Columbus.....	1.85	1.60	1.60	1.50@ 1.75						
Hocking screenings.....	Columbus.....	.80	.75	.80	.75@ .90						
Pitts. No. 8 lump.....	Cleveland.....	2.55	2.40	2.30	2.00@ 2.25						
Pitts. No. 8 mine run.....	Cleveland.....	1.90	1.85	1.85	1.85@ 1.90						
Pitts. No. 8 screenings.....	Cleveland.....	1.40	1.10	1.20	1.15@ 1.30						

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 3, 1923	Independent	Company	Nov. 24, 1924	Independent	Company	Dec. 1, 1924	Independent	Company
Broken.....	New York.....	\$2.34	\$8.50@ \$10.00	\$8.00@ \$9.25		\$8.00@ \$9.25					\$8.00@ \$9.25
Broken.....	Philadelphia.....	2.39		9.85@ 12.25	8.75@ 9.25		9.15				9.15
Egg.....	New York.....	2.34		9.85@ 12.20	8.75@ 9.25		9.45@ 9.75	8.80@ 9.25			8.75@ 9.25
Egg.....	Philadelphia.....	2.39		9.85@ 12.20	8.75@ 9.25		8.17@ 8.25	8.14@ 8.20			8.80@ 9.25
Egg.....	Chicago*.....	5.06		9.60@ 12.50	8.00@ 8.35		10.00@ 10.50	8.75@ 9.50			8.14@ 8.20
Stove.....	New York.....	2.34		9.85@ 12.25	8.75@ 9.25		10.10@ 10.75	9.15@ 9.50			8.75@ 9.50
Stove.....	Philadelphia.....	2.39		9.85@ 12.20	8.90@ 9.25		10.10@ 10.75	9.15@ 9.50			9.15@ 9.50
Stove.....	Chicago*.....	5.06		9.60@ 12.50	8.00@ 8.35		8.63@ 8.75	8.50@ 8.64			8.50@ 8.64
Chestnut.....	New York.....	2.34		9.85@ 12.25	8.75@ 9.25		9.75@ 10.50	8.75@ 9.25			8.75@ 9.25
Chestnut.....	Philadelphia.....	2.39		9.85@ 12.20	8.90@ 9.25		9.85@ 10.50	9.15@ 9.25			9.25@ 9.40
Chestnut.....	Chicago*.....	5.06		9.60@ 12.50	8.00@ 8.35		8.26@ 8.40	8.44@ 8.60			8.44@ 8.60
Pea.....	New York.....	2.22		6.15@ 7.50	6.15@ 6.65		5.00@ 5.50	5.50@ 6.00			5.50@ 6.00
Pea.....	Philadelphia.....	2.14		6.75@ 9.00	6.35@ 6.60		5.75@ 6.00	6.00			6.00
Pea.....	Chicago*.....	4.79		6.00@ 6.75	5.40@ 6.05		5.13@ 5.45	5.36@ 6.20			5.36@ 6.20
Buckwheat No. 1.....	New York.....	2.22		1.75@ 3.50	3.50		2.00@ 2.50	3.00@ 3.15			3.00@ 3.15
Buckwheat No. 1.....	Philadelphia.....	2.14		2.25@ 3.50	3.50		2.50@ 3.00	3.00			3.00
Rice.....	New York.....	2.22		1.25@ 2.50	2.50		1.75@ 2.15	2.00@ 2.25			2.00@ 2.25
Rice.....	Philadelphia.....	2.14		1.75@ 2.50	2.50		2.00@ 2.25	2.25			2.25
Barley.....	New York.....	2.22		1.00@ 1.50	1.50		1.25@ 1.50	1.50			1.50
Barley.....	Philadelphia.....	2.14		1.00@ 1.50	1.50		1.50	1.50			1.50
Birdseye.....	New York.....	2.22		1.60		1.40@ 1.60	1.60			1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

Index	1924			1923
	Dec. 1	Nov. 24	Nov. 17	Dec. 3
Weighted average price	\$2.07	\$2.06	\$2.06	\$2.19

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.

Industrial and public utility buying has been sufficient to keep the market well cleaned up in so far as screenings are concerned and at relatively good prices.

West Kentucky has been getting a fair but scattered business. The strike is disintegrating but not enough new tonnage has been produced to affect the market much.

Northwest Is Still Busy

The rush in coal trade continues at Duluth with anthracite the only laggard. This, however, does not worry the trade, as it is considered that all the hard coal now on hand will move of its own accord before spring. Shipments are good to the docks. Last week 37 cargoes arrived, of which 5 were hard coal, and 16 are reported on the way, of which 3 are hard coal.

Despite the attitude on hard coal sagging prices will not be surprising. There are more than 600,000 tons on three docks, and the total on all docks must be staggering. The supply of Pocahontas goes out as fast as it comes in and purchasers are not buying hard coal when they cannot get Pocahontas but are taking other substitutes such as briquets and other brands of semi-smokeless soft coal.

Docks are working more than full time. Orders in bituminous are coming in and there has been no change in the market. The Dakotas and other Western states are buying.

At the Twin Cities seasonable weather for two weeks has put a snap into the market which has been lacking for many months. There is no wild rush of orders, but a good steady demand, which has made the price schedule steady. There has been no serious congestion of stocks, and now that the winter season is at hand, the market starts with a fairly clean slate.

The first effect of cold weather was to start the retail demand in these cities in a way that has not been felt for a long time. Similarly there was a distinct pickup in the movement of domestic coal to the country. While the effect was to brace the market, it did not result in any changes of price, aside from screenings. These had been dragging sadly because of mild weather. Southern Illinois screenings advanced to \$1.40@\$1.60; lump coal was firm at \$3.25@\$3.50; central Illinois lump was \$2.75@\$3; western Kentucky lump, \$3. Dock prices remained at their list prices.

There has been no change in the coal situation in Milwaukee aside from a decline in the movement of coal up the lakes as the season of navigation nears the close. There are only a few more cargoes on the way. Dealers report the market quiet, as no biting weather has yet been experienced. The total amount of coal received in Milwaukee up to and including Nov. 26 is 767,394 tons of anthracite and 2,450,155 tons of bituminous coal—3,217,549 tons in all. In the same period of 1923 894,624 tons of anthracite and 3,086,622 tons of bituminous coal was received.

West Keeps Even Keel

Demand for prepared grades of Kansas coal is so light that, while list prices have not been changed, actual sales of Kansas lump are being made for as low as \$4.50 a ton. The list price is \$5. The screenings market, on the other hand is steadily becoming tighter, with few quotations under \$2.25 and many at \$2.35. Shading also is found in nut, although not so pronounced as in lump. Nut, which for several weeks had stood at \$4, is now being sold at \$3.75@\$4. There have been no changes in prices in other fields of the Southwestern district, although operating time throughout is averaging not more than 50 per cent of normal.

A slight drop in temperature last week stimulated the Colorado domestic market only a little. However, Colorado mines are doing fairly well, having worked on an average of 31 hours last week, and only 17 per cent of the total working time lost was attributed to "no market." Prices remain unchanged since Oct. 20.

As a result of colder weather, Utah mines are increasing output. Production is now 60 per cent of full-time capacity. Lump coal is not moving as well as it was and intermediate sizes are in better demand. Slack is described as easy. The California market is very good, but demand from the Northwest has fallen off again. The Idaho market is quiet, too, but business is better in Nevada. The home market is fair. The smelting industry continues to be the best industrial customer for coal. Sugar manufacturing in the Salt Lake district for this year is practically over. The shorter run is the result of a light beet crop. The labor situation is good and car supply is practically normal again.

Weakness Pervades Ohio Markets

The last week has been one of general weakness in the Cincinnati market. Domestic buying was off because of mild weather and the presence of big reserves against immediate buying in most of the retail yards. All movement of lake tonnage had been stopped by the close of navigation. Western fuel shipments were stopped by the fact that a lower freight rate is to be put into effect Dec. 5 and buyers were waiting to take advantage of it. Tidewater call was low because the coastwise business was bad. The byproduct market alone showed any buoyancy. It was much better.

Under all the circumstances prices held up amazingly well. This is explained, however, by a very prompt attempt in the Kentucky and West Virginia districts to check surplus production.

Recent rains have raised the water stage of the Ohio River so that half a dozen big companies engaged in river traffic now are bringing 40,000 or 50,000 tons of coal a week from the West Virginia districts, which is about double the tonnage that had been coming down.

Trade in Columbus and central Ohio continues rather quiet and featureless. As the lower temperatures did not last long, buying is still from hand to mouth and neither steam users nor dealers are inclined to stock up to any extent. Prices on domestic business have weakened as some decline in West Virginia quotations has been noted. It is difficult to find an outlet for demurrage coal. Steam contracting is not brisk and most of those with agreements are taking reduced tonnages. Screenings are selling at low figures because of the closing of the lake trade, which has thrown an additional amount on the market.

Screenings are now providing the only activity which is

discernible in the Cleveland market. These grades continue to be scarce and the prices are rising. There is practically no change in other grades; steam demand is quiet, and the retail yards are pretty well stocked for the winter. No changes in prices are noted on other grades. With the lake season over quite a few eastern Ohio mines are likely to close, causing prices on all grades to stiffen.

Pittsburgh Market Flops Again

Another slump has hit the Pittsburgh market, it being extremely difficult to sell coal on the open market. Some operators are believed to be inducing customers to take coal by making slight price concessions, the actual prices made not being ascertained. Consumers having regular mine connections are taking coal as usual. The railroads are running as heavily as ever and so are the industries. Domestic distribution, however, has been poor. There is no change in quotable prices save for a stiffening in slack.

The Buffalo market is dubious with so little seasonable weather. The trade has about given up all idea of an active business this winter. Canada is still pretty hard to do business with, as industry in general is dull there and does not promise to pick up much right away. With the nearing of the end of the lake season the supply of slack is short and the demand is better.

There is practically no change in the Toronto market, demand continuing to be light. Quotations are as follows: Pennsylvania smokeless, \$5.85; slack, \$5.

Dullness Lingers in New England

In New England the steam coal market continues dull and with no prospect of change during December. Shipments are being made in fair volume coastwise, but practically all is being applied on contracts. Spot business is very light, and while efforts are being made to encourage buying against the winter months the consumer is still making only sparing purchases.

At Hampton Roads the accumulations are by no means heavy, but the agencies find themselves obliged to watch the trade closely in order to move current output. Recent sales of Pocahontas and New River of Navy acceptable grade have averaged \$4.20@\$4.35, with less desirable coals selling off to \$4.

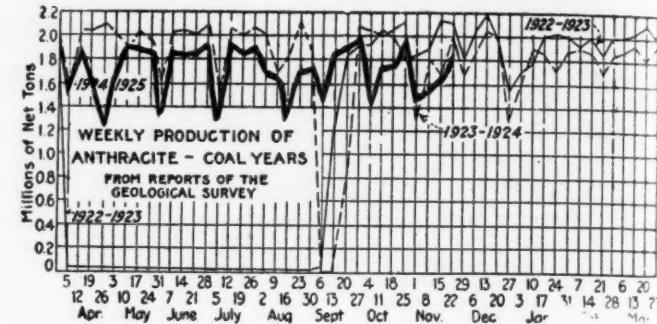
For delivery inland from Boston, Providence and Portland high grade smokeless coals are in ample supply, with only moderate inquiry. At Boston \$5.35 per gross ton is the utmost that these grades command on cars for mine run. Slack is being offered much lower than the usual differential at the mines would indicate.

All-rail from central Pennsylvania there is only a fair tonnage moving into this territory. The selling radius of Southern coals is now wide enough from rehandling wharves here to restrict the opening for rail coal much more than was the case early in the season.

Atlantic Markets Develop Softness

A softer market for spot coal prevailed at New York last week and it is expected that buying now will be subject to weather conditions. Most consumers have bought quietly and at present are well stocked up. Demand for some grades of West Virginia coal has eased off to such an extent that mining has been curtailed somewhat. So much coal is coming to the New York tidewater piers that it is moved only by intensive sales effort.

At Philadelphia the cold spell quickly spent itself and had little effect on the coal trade. Many large users still purchase a fair amount of spot coal but the amount they buy



under contract has increased recently. Demand is centered on high class coals, which tends to keep the low grade fuels pretty well off the market. Not much coal is standing at tide, as the loadings are very light, with bunkering slow.

Demand at Baltimore is about what it has been for several weeks past, and shipments have more than kept pace with the call for coals for immediate use and storage against the near future. Prices are constant and there has been little change for several weeks past. November exports of coal at Baltimore have continued to lag behind those of October, only two shipments having been made between the 10th and 28th.

Some fairly seasonable weather at Birmingham brought temporary activity in the retail domestic movement, but as yet the mines are booking only scattering orders for small lots. Some mines are well fixed on domestic business under contracts and are booking enough spot orders to move the output, but as a whole the market is sluggish. Buying of steam coal has not materially improved. Bunker demand is reported normal as compared with recent weeks. Quotations are holding fairly steady.

Anthracite Trade Turns Soft

New York anthracite consumers are taking things easy, most of them having put in enough coal to tide them over a few days of cold weather. Receipts have been cut down by frequent strikes at the mines but independent prices have not been affected to any material degree. Demand for stove coal continues in excess of the supply. Egg and chestnut move steadily, but pea, outside of the best grades, is hard to move. There is some activity in steam coal, buckwheat being in a little better demand, with rice and barley a trifle easier than last week.

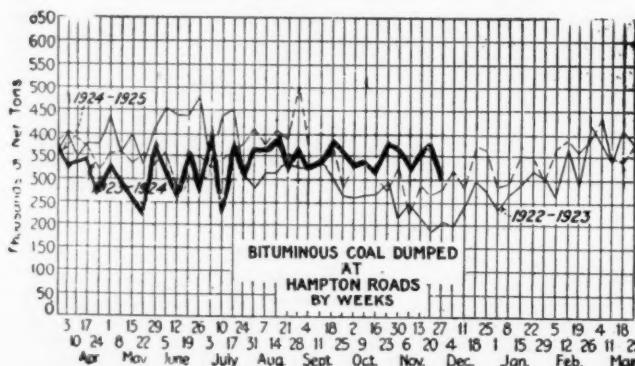
The little splurge at Philadelphia occasioned by the brief cold spell soon disappeared and dullness has overtaken the retail men. The operator has not felt the dropping off in retail demand, as the dealer is trying his best to store away all the coal that is due him. Nut is in heavier demand and is extremely short with some shippers. There is a strong call for stove, but the gap between this and nut widens almost daily. All shippers continue to have some difficulty in moving egg and pea is almost as bad. Steam coals are quiet and the demand is fairly well met.

Continuance of mild weather at Baltimore has limited hard coal burning to a moderate amount. Supplies in yards are ample to meet all demands and there seems to be no scarcity of any particular size at present. The trade is much interested in just how much attention will be attracted by the coming exhibit in this city of burning devices for buckwheat size coal.

Soft weather at Buffalo is making it hard to sell anthracite. Consumers prefer to use gas, even if it costs more, as it gives so little trouble. Consumers seem indifferent of the future and refuse to buy coal when the weather is mild. They are looking for cheaper substitutes and they seem to find them.

Toronto dealers are quite busy, the setting in of cold weather having stimulated the domestic demand.

Car Loadings, Surplusages and Shortages



Week ended Nov. 15, 1924.....

Previous week.....

Week ended Nov. 17, 1923.....

Cars Loaded

All Cars 1,015,704

Coal Cars 188,229

994,504 171,985

992,050 170,998

Surplus Cars

All Cars 145,589

Coal Cars 79,111

116,448 60,097

71,119 31,850

Car Shortage

..... 3,901

..... 1,169

Foreign Market And Export News

Lean Foreign Trade in British Market; Slight Upturn in Output

Some improvement in the Welsh coal trade is evident due to the arrival of tonnage delayed by the recent heavy weather. Inquiries are more numerous but demand must show a much greater increase before business can be said to be anywhere near normal. Most of the collieries have enormous stocks of coal still standing, and it is the exception to find a pit working more than three shifts per week. Several pits have reopened this week but the relief to the heavy unemployment in the Welsh fields has been counteracted by the closing down of more pits. France is buying slightly more coal and there are more inquiries from South America. Italian business is very slow. Much foreign business is going to Germany and America.

The official audit of South Wales trade shows a net loss every month since the May wage agreement, the total loss for the first four months being £629,843. The October audit probably will increase this loss. Colliery owners are losing heavily on the present price basis and many contracts expiring at the end of the year will not be renewed. The future depends upon resumed production of European manufacturers or on lower wage cost through an eight-hour day. It is stated that the miners' leaders are organizing for a reduction of working hours to effect the absorption of unemployed and also for an increase in the minimum wage from 8s. 4d. to 12s. per day.

The Newcastle market shows an all round slight improvement, but steamers have made more headway than the other classes. Gas coal is in fair demand on the Continent. The situation here changed from an oversupplied and vacillating market to distinctly hardened prices. The Genoa gas works are asking for 30,000 tons of Durham gas coals for shipment from January to May, 1925, and Gothenburg for 10,000 tons of Wear gas coals for shipment from January to March, 1925.

Production by British collieries in the week ended Nov. 15, a cable to *Coal Age* states, totaled 5,232,000 tons, according to the official reports. This compares with an output of 5,137,000 tons in the week ended Nov. 8.

Prices Soften in Dull Market At Hampton Roads

The coal market at Hampton Roads is dull and prices are soft, with inquiries slackening and bunkers and coastwise alone holding their own. Foreign business is decidedly spotty and showing a tendency to decrease.

Supplies at the piers have been increasing and an increase in coastwise movement was reported. Piers have arranged to operate on Sundays in order to accommodate ships more readily, and this action has had a tendency to increase future business. As a whole the market is dragging.

Softening of prices is attributed to increased supplies at tide. Retail business is booming but has had no effect on the market as the winter's supply have already been provided for at contract figures.

Lower Output Not Likely to Affect French Market

With 23 working days in November—Nov. 1 and 11 are holidays in France—output is expected to be lower, but on the whole the situation is unchanged. There has been a slight increase in inquiry for industrial coals, due to heavier consumption in the plants and further pressure of sterling, which increases the cost of British coals.

Activity is relatively moderate in house coals and bituminous screened fuels are selling freely.

Deliveries of indemnity fuels to France and Luxemburg in October amounted to 516,700 tons of coal, 328,800 tons of coke and 39,300 tons of lignite briquets, a total of 884,800 tons.

In the first six days of November the total receipts were 64,300 tons, including 51,300 tons of coal; 3,900 tons of coke and 9,100 tons of lignite briquets. Deliveries were resumed on a normal scale Nov. 10.

Under the Reparation Commission's plan, the share of France in the apportionment of indemnity fuels between the Allies as from Nov. 1 will be 671,000 tons a month (250,000 tons of coke), but with the meager deliveries during the last fortnight it is doubtful that the Germans will be able to meet their commitments this month.

Export Clearances, Week Ended Nov. 29, 1924

FROM HAMPTON ROADS

	Tons
For Canal Zone:	
Amer. Str. Ulysses, for Cristobal....	12,016
For Cuba:	
Nor. Str. Lisbeth, for Santa Lucia...	3,941
Amer. Schr. Rosemary, for Manzanillo	1,191
For Canada:	
Br. Str. Canadian Gunner for Charlottetown	1,502
For Brazil:	
Ital. Str. Attualita, for Rio de Janeiro	8,339
Br. Str. Pontypridd, for Santos ...	6,656
For Porto Rico:	
Amer. Schr. Virginia Pendleton, for Humacao	2,100
For Italy:	
Ital. Str. Posillipo, for Genoa.....	8,282
For France:	
Ital. Str. Emanuele Accame, for Dunkirk	11,945

FROM PHILADELPHIA

For Cuba:	—
Nor. Str. Bessegen, for Havana.....	—
For Brazil:	—
Br. Str. Dovenby Hall, for Rio de Janeiro	—
Br. Str. Golden Cape, for Rio de Janeiro	—

FROM BALTIMORE

For Porto Rico:	
Am. Str. Delisle, for San Juan.....	1,096

Hampton Roads Pier Situation

	Nov. 20	Nov. 27
Cars on hand.....	1,229	1,158
Tons on hand.....	73,403	69,545
Tons dumped for week.....	95,895	105,526
Tonnage waiting.....	20,000	13,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	1,984	1,840
Tons on hand.....	129,900	123,950
Tons dumped for week.....	94,492	95,128
Tonnage waiting.....	8,395	14,245
C. & O. Piers, Newport News:		
Cars on hand.....	1,554	2,073
Tons on hand.....	86,575	107,490
Tons dumped for week.....	135,696	66,806
Tonnage waiting.....	3,950	7,875

Pier and Bunker Prices, Gross Tons

PIERS

	Nov. 22	Nov. 29†
Pool 9, New York....	\$4.75@ \$5.00	\$4.75@ \$4.85
Pool 10, New York....	4.50@ 4.75	4.40@ 4.65
Pool 11, New York....	4.40@ 4.55	4.30@ 4.35
Pool 9, Philadelphia....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia....	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia....	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads....	4.25	4.20
Pool 2, Hamp. Roads....	4.10	4.10
Pool 5-6-7 Hamp. Rds....	4.00	4.00

BUNKERS

Pool 9, New York....	\$5.00@ \$5.25	\$5.00@ \$5.10
Pool 10, New York....	4.75@ 5.00	4.65@ 4.90
Pool 11, New York....	4.65@ 4.80	4.45@ 4.60
Pool 9, Philadelphia....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia....	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia....	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads....	4.35	4.30
Pool 2, Hamp. Roads....	4.20	4.20
Pool 5-6-7 Hamp. Rds....	4.10	4.10

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to *Coal Age*

Cardiff Nov. 22 Nov. 29†
Admiralty, large... 27s. @ 27s. 6d. 27s. @ 27s. 6d.

Steam smalls... 16s. @ 17s. 16s. @ 17s.

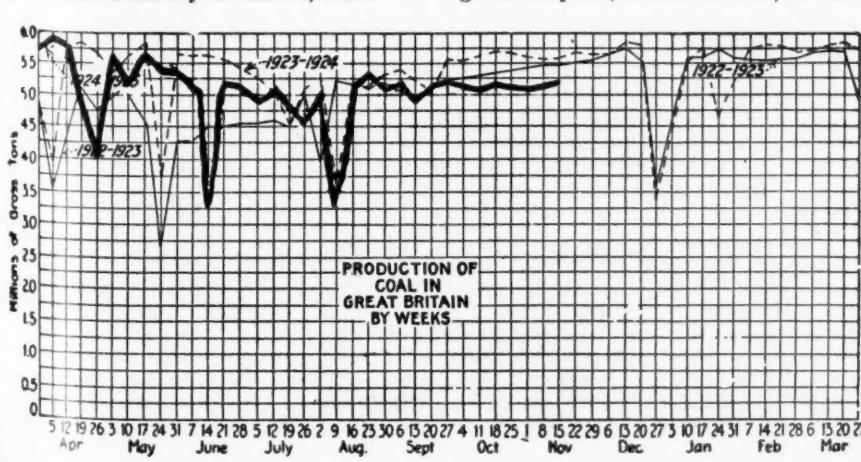
Newcastle:

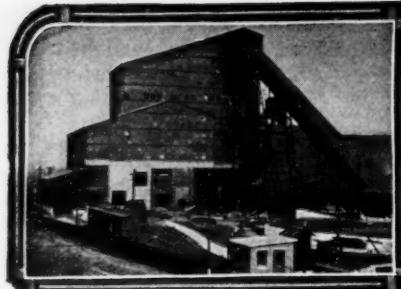
Best steams... 18s. 3d. @ 22s. 6d. 19s.

Best gas... 21s. 22s.

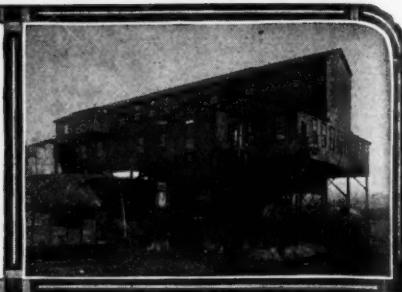
Best bunkers... 17s. 6d. @ 19s. 17s. 6d. @ 18s.

† Advances over previous week shown in **heavy type**, declines in **italics**.





News Items From Field and Trade



ALABAMA

The construction of two washers, one costing \$50,000 at Dora, and the other costing \$20,000 at Jagger, was announced by the Pratt Fuel Corporation. Operations will begin during December. The washers are of small types but are expected to care for the tonnages at these two mines. The company is engaged in other construction involving the appropriation of a large sum.

A report to the effect that the Woodward Iron Co. would add a number of Koppers ovens to its byproduct plant at Woodward has been officially denied.

Work is progressing rapidly on the new coal washery and alterations in the tipple at the Empire Mines of the DeBardeleben Coal Corporation, with completion of the improvements planned by Jan. 1. A Montgomery washer is being built and Deister concentrator tables are being installed for treatment of product from 4 in. down, which it is stated will reduce the ash content of the fines to a very low percentage. About \$100,000 is being spent on these betterments.

Forest fires burning near the Gamble mine, in Walker County, were communicated to the interior of the mine through the airshaft and ignited the coal, which is reported to be still burning. Scarcity of water has retarded the fight to extinguish the fire in the workings, and considerable damage is said to have been wrought at this writing. The mine is a small one operated by L. T. Bouchelle. No men were trapped in the workings as at first reported.

COLORADO

R. K. Graham has resigned his position as superintendent of the Dick Coal Co. at Boncarbo. He is succeeded by Peter J. Miller. Mr. Graham has moved to California.

Effective Dec. 1, J. B. Marks was appointed assistant to the president of the Colorado Fuel & Iron Co. He also will continue to act as purchasing agent.

ILLINOIS

Mine No. 1 of the Spring Valley Coal Co., Spring Valley, has resumed work at pick mining. About twenty-seven places have been opened and employment given to seventy men.

Theo. C. Keller, president of the Keller Coal Co., of Chicago, which operates big mines at Hillsboro, Taylor

Springs, Nokomis and Witt, has just been granted a fifty year franchise by the City of Witt to light the city. Keller is negotiating a similar contract at Wenonah, where one of the largest mines is located. He announces that a huge power plant will be erected at Witt to furnish power to run all the company's mines in addition to furnishing the city lighting.

The Spring Creek coal mine, located three and one-half miles northeast of Springfield, was scheduled to begin work Dec. 1, employing 400 men. The daily hoist will be 2,200 tons.

The Wall Coal Mining Co. of St. Louis, capital \$10,000, has leased the old Keystone Mine near Marion. The Cameron Coal Co. has operated this mine since 1917 with Frank W. Coal as superintendent and W. C. Coal, manager. Their plans for the future are not definite. H. W. Bradbury is the new superintendent and H. R. Wall, of St. Louis, is president.

The Cosgrove-Meehan Coal Co., which operates twelve mines in Pennsylvania and five in this state, has purchased the Panama mine on the Nickel Plate railroad, near Panama. This announcement was made by Enoch Carver, Jr., president of Cosgrove & Co., Inc., who are the selling agents for the Cosgrove-Meehan Coal Co. The Panama mine has a daily capacity of 3,300 tons and this will be increased to 4,000 tons. This company will now have the only two mines on the Clover Leaf division of the Nickel Plate.

Pen and pencil nightly replace the pick and shovel of coal-digger pupils enrolled in the educational department of Subdistrict 5, United Mine Workers, which has its headquarters at Taylor, Ill. Organized last convention time on recommendation of President William Daech, the department has proved its success by turning out more than 200 miners as graduates of the first course. Most of the work is done by the miners in their own homes, but they come together in seven different localities—Taylorville, Hillsboro, Panama, Nokomis, Pana, Kincaid and Tovey—twice a month, studying American history, economics and similar subjects.

William Van Dusene, Jonesboro, and associates plan extensive strip mine operations along the old right of way of the M. & O. R.R., near Millstadt. The company plans to purchase 1,000 acres between Millstadt and Smithton, mostly in the High Prairie neighborhood. Options have been taken upon 500 acres at a reported average of \$135 an acre. Drillholes will be sunk at once over this territory. In the High

Prairie region are many small mines, operated mostly by farmers. At one time there was enough extensive mining in this territory so that a narrow gage railroad, privately owned, was operated to Millstadt, where there was a tipple and standard gage railroad loading plant.

Production in the Shuler mine, at Alpha, on a recent day totaled 622 tons, which is a new high record for single day production at this new shaft. Approximately 100 men are employed. The mechanical equipment at Alpha provides for eventual output of 2,000 tons.

Announcement has been made that the Radium mine, owned by the Aluminum Ore Co., in the Belleville field, will be closed down indefinitely, possibly for the entire year. The company finds purchasing of coal upon the open market cheaper than operating the mine. More than three hundred men have been thrown out of employment.

INDIANA

The West Jackson Hill Coal Mining Co. at Sullivan, has filed a preliminary certificate of dissolution.

A committee of operators of strip mines in southwestern Indiana headed by Roy E. Price, of the Stockton Coal Co., has proposed to Richard Lieber, director of conservation of the state, that the operators of these mines turn the land over to the state for game preserves. The committee proposes to give the lands to the state with the provision that the department reclaim them with native vegetation. The conservation officials are considering the offer.

With about eleven mines working daily in the Clinton field, a marked improvement in the mining industry is noticeable in that section. Not long ago not more than five mines were working. According to operators from that section, there likely is to be a gradual betterment in the industry.

A verdict of \$25,000 damages was given Nov. 21 in federal court in Indianapolis to James Gatherun, former mine boss of the Queen Coal & Mining Co. at Jasonville. Gatherun, who had been mobbed and chased out of town, brought suit against thirty-three residents, asking \$50,000, but charges against two of the thirty-three were dismissed. The case attracted statewide attention, since for a time Jasonville developed symptoms of becoming another Herrin. Among the defendants, who failed to give any support to the mine boss when miners concluded he no

longer was wanted, were the Mayor, Chief of Police, one patrolman and the financial secretary of the local of the United Mine Workers.

IOWA

Drilling for coal at Bedford will begin at once. Three holes will be drilled at first, the expense to be covered by public subscription. Coal was discovered at Bedford in 1879, and there are a number of places in the vicinity where prospecting can be done. Since the establishment of a mine at Gravity, interest in the project has steadily grown.

KANSAS

A movement to force a special convention of the United Mine Workers of District 14 to consider the removal of the present district officials and to place the name of Alexander Howat on the ballot at the biennial election in December was launched at a mass meeting of 2,000 miners in Arma, Nov. 16. The action was precipitated by the board refusing to place the names of Howat and more than a score of other candidates on the ballot on the ground that the international had ruled them ineligible. At the mass meeting copies of a form of resolution, the adoption of which by twenty locals would require the calling of a convention for not later than Dec. 4, were distributed.

KENTUCKY

The Pontiac Mining Corporation has acquired the property of the Pontiac Coal Co., Madisonville, including coal mines, houses and other equipment.

The Swift Coal Co. will develop coal land in the neighborhood of Roxana, and will not only establish a plant but develop a mining town.

C. W. Johnson, attorney, has been named receiver for the Dixie Diamond Coal Co., retailers, 1201 East Main Street, Louisville, by Judge George A. Brent, referee in bankruptcy. Petition for receivership was asked by Harry J. Hood, president of the company, and John B. Carroll, receiver for the Looney

Creek Coal Co. Receiver Johnson was instructed to report on the advisability of continuing the operation of the company, as requested by Mr. Hood in the petition.

T. P. Middleton, Assistant Banking Commissioner, in charge of the Blue Sky Department, has granted permission to the Montgomery Creek Coal Co., of Vilco, to sell \$85,000 in bonds for the payment of company debts, the bonds to carry 6 per cent and to be issued to each creditor in amount not exceeding the sum due that creditor from the coal company.

It was stated at Harlan on Nov. 17 that the Wisconsin Steel Co., operating at Benham had increased its production to thirty-five cars a day and was operating six days a week since the election.

MINNESOTA

The Clarkson Coal & Dock Co. has sold an issue of 6 per cent gold bonds in the sum of \$6,500,000. The money is to be used for refunding and for improvements. The bonds were snapped up as soon as offered which is considered a good sign by coal men of the Northwest.

OHIO

The date for the sale of the assets of the Maynard Coal Co., of Columbus, which went into the hands of receivers William S. Harman and Frank L. Stein, about a year ago, has not been set but it is expected it will be offered for sale under order of court some time in December. The assets consist of working mines in the Pomeroy field in Ohio and the Hazard field in Kentucky. There are four large mines in Ohio and three in Kentucky. The Kentucky mines have been operated by the receivers and have been showing a good profit, but the Ohio mines are closed.

The LaBelle mine, at Steubenville, owned by the Wheeling Steel Co., of Wheeling, W. Va., was the scene of a recent explosion while 125 men were at work. All escaped without injury except one man who was seriously burned. The LaBelle mine is adjacent to the Brentwood mine, which claimed 119 lives in an explosion in April.

Jerome Watson, chief of the state mine division, recently learned also that miners had become ill from fumes and gases while working in the Blue Rock mine, owned by the Blue Rock Mining Co., of Zanesville, 17 miles east of that city. This mine had been sealed since the flood in 1913 and was opened in October, 1924. Inspectors were unable to locate the source of the gas. It is thought that the mine will be permanently sealed.

Quite a few coal men of Columbus attended a meeting of the Ohio Valley Shippers Advisory Board, which was held at Louisville Ky., recently. Included in the number were G. K. Mitchell, traffic manager of the New York Coal Co.; H. S. Morris, traffic manager of the Hocking Valley R.R., and others. William E. Tytus, sales manager of the Sunday Creek Coal Co., was named vice-chairman of the coal and coke committee of the board.

OKLAHOMA

Ernest Ingram, assistant sales manager of the McAlester Fuel Co. for the past six years, has resigned and accepted the position of sales manager of the Gem Coal Co. of Henryetta.

PENNSYLVANIA

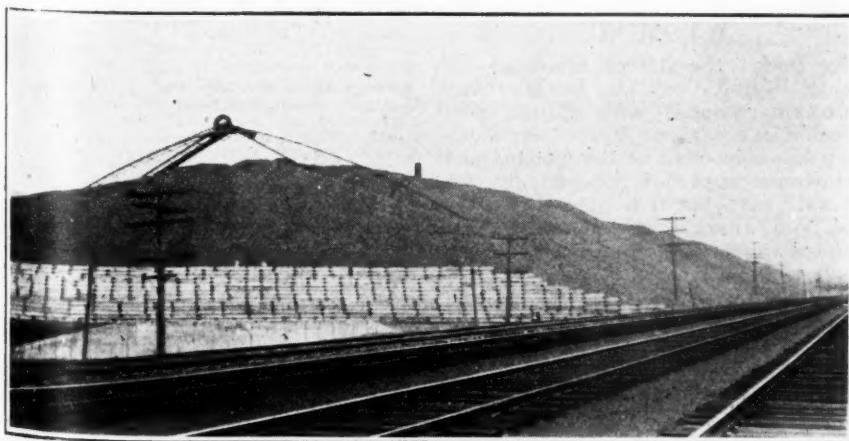
A plot of ground at Larksville, near Wilkes-Barre, one-fourth of a mile square, dropped from 5 to 10 ft. early Nov. 26 as a result of a mine disturbance in the operations of the Hudson Coal Co. Five properties owned by the company were in the affected area, two of which were damaged beyond repair. Although the families in the sunken area and in the adjoining sections were thrown from their beds, there were no casualties.

The Pennsylvania Coal & Coke Co. and subsidiaries report an October deficit of \$40,359 before federal taxes, but after depreciation and depletion, against a deficit of \$10,431 in October, 1923. The deficit for the first ten months of 1924 totaled \$329,015, against a surplus of \$726,221 in the corresponding period of 1923.

The coal and coke business in the vicinity of the Connellsburg coke region is still on the increase, although prices are remaining about stationary. The Century Coke Co., at Brownsville, with 205 beehive ovens, is preparing to resume operations next week, as is also Pike mine of the Hillman Coal & Coke Co., a union mine on the edge of the coke region at Brownsville.

Fire recently destroyed the breaker, blacksmith shop, wash shanty and air compressor room of the Wilson Hill Coal Co. at Simpson, causing a loss of \$30,000. Firemen prevented the flames from reaching a building in which powder was stored.

Directors of the Lehigh Valley Coal Co. held their monthly meeting last week, but did not announce a dividend. Since the separation of the coal and railroad interests, at which time much stock changed hands, stockholders have been waiting for a dividend to be



A Few Shovelfuls for a Chilly Day

This snapshot, taken late in October, shows a pile of domestic sizes of anthracite at the storage plant of the Hudson Coal Co., near Jermyn, Pa. The coal was mined during the last summer.

declared. Several meetings have been held without any action being taken. Efforts to elicit any further statement from the officials of the company other than that there had been no declaration of a dividend were unavailing.

TENNESSEE

Leonard C. Crewe has resigned as president of the LaFollette Coal & Iron Co., and the Volunteer Fuel & Iron Co., both of LaFollette. Until Mr. Crewe's successor has been elected, S. S. Pratt, of LaFollette, vice-president of the company, is acting as president.

UTAH

J. R. Roaf, engineer at the Kenilworth mine of the Independent Coal & Coke Co., left Dec. 1 to become superintendent of the Royal Coal Co. at Rolapp. Mr. Roaf has had considerable experience in the Crows Nest Pass country, in the Yellow Head Pass and Vancouver Island Coal fields in Canada.

Moroni Heiner, vice-president and general manager of the United States Fuel Co., of Salt Lake City, for several years past, has resigned the general management and will be succeeded by D. D. Muir, of the United States Smelting, Refining & Mining Co., which has offices in the same building as the coal company. Mr. Heiner was one of the organizers of the company and holds a large block of stock in it. It was stated that he will retain his office of vice-president and still take an active interest in the company. He probably will take a rest on the Pacific Coast for two or three months.

VIRGINIA

A dividend of 24 per cent has been declared on the preferred stock of the company by the directors of the Virginia Iron, Coal & Coke Co. payable Jan. 2 to stockholders of record on Dec. 13.

WEST VIRGINIA

The Shriver Coal Co. settlement on Scott's Run, an open-shop operation, was the scene of disorders Nov. 26 during which a child was seriously wounded and an attempt made to dynamite the tipple. Two explosions ripped out a part of the approach to the tipple and damaged the loading apparatus. The blasts were followed immediately by rifle shots from a hillside. Sarah Rokys, five years old, standing in the doorway of the cabin occupied by her parents, suffered a wound in the chest. Attending physicians said she could not live.

Following closely on the heels of the election, the Pulaski Iron Co. ordered the immediate firing of its entire battery of 600 coke ovens at Eckman. It is stated that active preparations are now being made to assemble the necessary working forces to put the ovens in blast.

Late in November a large number of new coal cars for the Pinnacle and Crane Creek operations of the American Coal Co. were received. The plants of the company are working regularly

and are loading more coal at present than at any time during the year.

Figures compiled by the Chesapeake & Ohio show that there were 43,339 cars of coal loaded on that road in November, up to and including the 18th, with every prospect that the heavy loading of October will be equalled in November. Loadings by fields during the first eighteen days of November were as follows: New River, 10,186 cars; Kanawha, 6,336; Coal River, 3,512; Logan, 18,481; Kentucky, 4,823.

W. A. Richards, of Pottsville, Pa., has been made general manager of the Pemberton Coal & Coke Co., in the Winding Gulf district; the Ashland Coal & Coke Co., in the Pocahontas district, and the Majestic Collieries Co., operating on the Kentucky side of Tug River in the Thacker district. The total output of the mines of the companies mentioned will average over a million and a half tons per year. The new general manager is the son of W. J. Richards, president of the Philadelphia & Reading Coal & Iron Corporation, and has been identified with the coal industry since he was a young man. He is a graduate of Lehigh University. Mr. Richards will have his headquarters for the present at Ashland.

Since the early part of November the Nuriva Smokeless Coal Co., operating at Nuriva, nineteen miles west of Mullens, of which W. H. Ribt is general manager, has been running its mines regularly and giving its men daily employment.

Deputy sheriffs and state police have been investigating an explosion that wrecked the aerial tram coal conveyor of the Clarksburg Big Vein Coal Co.'s mine west of Adamston a few days ago. The mine was out of commission for several days as a result of the explosion, which entailed damage to the extent of about \$2,000, according to officials of the company. The company has been operating on a non-union basis since April 1 last. The explosion was the second one at the same mine within four months. Another explosion occurred not long ago at the Fort Pitt mine at Wilsonburg, the owners of which are affiliated with the owners of the Big Vein mine.

WYOMING

By Dec. 1 the sixteen mines of the Union Pacific Coal Co. in Wyoming were all equipped with Edison permissible cap lamps. The electric cap lamp has been used at the Cumberland and Hanna mines of the company for several years, but it is only within the past two weeks that they have been adopted in the Rock Springs area.

The Rock Springs chapter of the Rocky Mountain Coal Mining Institute held its November meeting at Reliance, Nov. 20. This chapter has adopted a program for the winter which will cover the study of mining conditions in southwestern Wyoming, members giving reports on the different problems at each monthly meeting. As the membership is scattered through the several camps around Rock Springs, a meeting will be held at each place. Miners in-

terested in problems of the industry are being encouraged to join this chapter.

The Water system being constructed by the Union Pacific Coal Co. at Reliance is nearing completion and the company has its geologist conducting a survey of the Superior vicinity in search of a better water supply for that camp.

Jack Smith, safety engineer for the Union Pacific Coal Co., returned Nov. 21 from a trip to Trinidad, Colo., and Raton, N. M., where he was studying the rock-dusting methods used in those fields.

CANADA

The railroads are finding that they need only about 75 per cent of the steam coal they had stored for consumption, as the grain crop is much smaller than was expected. The result is that the steam coal mines in the West are obliged to shut down, as was the case at Fernie and Coal Creek. The Drumheller mines are all working on orders for the prairies, mostly for Manitoba and Central and Northern Saskatchewan.

The One Big Union is having difficulty in functioning in Springhill. Ben Legere, organizer, from Lowell, was not allowed to speak indoors on the ground that permission of the local officials of the United Mine Workers must first be obtained. Legere failed to obtain this consent and was forced to address his followers and others from the front of the hotel in which he was a guest. About 65 per cent of the Springhill local has decided to remain within the miners' union and will not affiliate with the Communist or the One Big Union factions.

New Companies

The Daisy Coal Co., Krypton, Ky., capital \$10,000, has been chartered by William Stott, Daisy Stott and Edgar Harris.

The Miners' Co-Operative Coal Co. has been chartered with an authorized capital of \$15,000 to mine coal in the Bergholtz (Ohio) field. The incorporators are: J. C. Stabley, Steven C. Tolck, J. P. Kinney, Patrick Harvey and J. E. Guy. This is one of the many co-operative mines being opened in Ohio.

A new coal company launched in West Virginia about the middle of November was the **Inspiration Mining Co.**, with headquarters at Clarksburg. The company has a capital of \$25,000. C. D. Floyd and associates organized it.

The Coalton Colliery Co., P. O. Building, Wellston, Ohio, has been chartered with an authorized capital of \$25,000 to mine and deal in coal. Incorporators are W. H. Parker, Grant McGhee, George Shook, H. R. Kisler, A. M. Scott and L. E. Vogelsong.

Papers have been filed chartering the **Liberty Coal Mining Co.**, of Columbus, Ohio, with an authorized capital of \$10,000, to mine, buy, sell and deal in coal. Headquarters have as yet not been established but they will as soon as suitable location is found. A mine is being operated at Moxahala, Ohio, in the Syndicate field, on the T. & O. C. R.R., mining Hocking No. 6 coal. Chas. A. Brunner, Albertus M. Steck, W. W. Daniel, Harold J. Roberts and Edward S. Beard, all familiar with coal operations, are the incorporators. Officers as yet have not been elected.

Papers have been filed incorporating the **Bituminous Collieries Co.**, Cleveland, Ohio, with a capital of 3,750 shares, no par value designated, to mine coal and deal in coal and coke. Incorporators are Frank T. Kerr, William R. Butcher, Jr., Lawrence E. Imhoff, Winifred A. Gray and John C. Nichols.

Traffic

Seek Freight Rate to Throttle Non-Union Mines

Harlan (Ky.) operators have been advised that an effort is being made to bring pressure to bear on the Interstate Commerce Commission to impose a freight rate differential of 75c. a ton on coal going into the Northwest from the Harlan district, as compared with coal moving from the Central Competitive or union fields. It is claimed that Central operators as well as union labor would like to throttle the non-union Kentucky sections.

It was reported from Harlan on Nov. 22 that the Louisville & Nashville R.R., with an average of 1,067 cars of coal daily off the Cumberland Valley Division had set a new week's loading record for the division. It is also stated that there will be some double tracking of the division next year, due to great increase in tonnage handled.

Sustains Reduced Coal Rate To East St. Louis

Judge Crow, at Belleville, Ill., has sustained an order of the Illinois Commerce Commission ordering a 21c. reduction in coal rates to East St. Louis from mines within a radius of 20 miles of East St. Louis. He ruled against the 30-mile radius. The new rate is to be 71c. on coal within the 20-mile circle and 91c. on coal beyond in what is now the 91c. rate field. The important Mt. Olive and Staunton fields are outside, as well as the Sparta, Marissa and Coulterville groups. Coal moving out of Illinois will not be benefited—the rate is local to East St. Louis only. It is likely that the railroads and important operators in the territory discriminated against will further contest this order.

Rates Shaded in South Dakota

The South Dakota Railroad Commission announces some concessions in freight rates on coal to various points in that state, principally the western part. Reduced rates have been arranged from the docks on Lake Superior and Lake Michigan to territory west of Chamberlain and Pierre, on the Missouri River. Another reduction is expected to points on the Pollock branch line of the Soo and also on the Fairmount (N. D.) line which extends into South Dakota. Reductions have been made from the Illinois mines to western parts of South Dakota.

Trade Literature

W. A. Jones Foundry & Machine Co., Chicago, Ill., in its catalog No. 29, on gears, covers the subject quite extensively. It contains 224 pp.

Illinois Chain Grate Stokers. Illinois Stoker Co., Alton, Ill. Third edition of Catalog L. Pp. 62; 8 x 11 in.; illustrated. Embodies a complete discussion of type A (natural draft) and type G (forced draft) stokers. A number of blueprint drawings are included, and the catalog should prove valuable to power-plant operators.

Tipple Equipment. Fairmont Mining Machinery Co., Fairmont, W. Va. Pp. 32;

8 x 11 in.; illustrated. Describes the different installations made throughout this country by this company. The book is well illustrated.

Herman H. Sticht & Co., 15 Park Row, N. Y., manufacturers of electrical and industrial instruments, have just announced the publication of a new bulletin No. 128 on the subject of **what constitutes safe insulation**. This little bulletin explains in a concise manner how and why electrical insulation breaks down. It also points out the value of periodically testing all electrical equipment.

Industrial Notes

The John F. Folkers Engineering Corp., Mobile Ala., has been appointed agent to handle sales and service for the Triumph Electric Co., of Cincinnati, in the Mobile territory.

The Hitchman Coal Co. is having a new conveyor system installed at its mine at Moundsville, W. Va., by the Fairmont Mining Machinery Co. The conveyor is to be somewhat similar to those used at Lorain and will be utilized in coaling all Baltimore & Ohio engines at the western end of the Wheeling division as well as to load coal in cars for shipment. This conveyor will reach a short distance into the shaft of the mine, where a new type of coal car especially designed for conveyor work will bring the coal from the various sections of the mine to the conveyor pit, from which point the coal will be carried to the top of the tipple ready to be shipped out. As soon as the new conveyor system is completed the large coal tipple, extending the full distance from the mine over the B. & O. yards and out over the storeroom department of the local railroad will be torn down, although only recently reinforced by cement foundations and cement holdings along the side girders.

W. F. Hebard & Co., 551 W. Van Buren St., Chicago, Ill., has been appointed to act as sales representative of The Ironton Engine Co., in the Chicago district, particularly in connection with Ironton storage battery industrial locomotives.

Association Activities

At a general field meeting of the **Winding Gulf Operators Association** held in Beckley, W. Va., late in November, the association passed a resolution opposing the proposed child labor amendment to the federal constitution. The association also expressed appreciation of the assistance of Col. W. J. McLaren of McDowell County in giving impetus to road building in West Virginia. Colonel McLaren has resigned as road engineer of McDowell County.

Obituary

News was received at Lexington, Ky., on Nov. 25, of the death in a hunting accident at Umatilla, Fla., of **J. W. Reedy**, 50, formerly a prominent coal operator of Lexington, Ky. He was formerly associated with C. R. Luttrell, of the Montgomery Creek Coal Co., at Vico, in Perry County, Ky.

Thomas Worth Currie, age 36, who had been connected with the New Castle Coal Co. for a number of years and was well known in coal circles, died Nov. 22 after a short illness with pneumonia. Mr. Currie is survived by a wife, two children and several brothers and sisters.

Coming Meetings

West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers. Fourth annual convention, Dec. 12 and 13, Huntington, W. Va. Secretary-Treasurer, Herbert Smith, Huntington, W. Va.

American Institute of Mining and Metallurgical Engineers. Annual meeting, Feb. 16-19, 1925, 29 West 39th St., New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

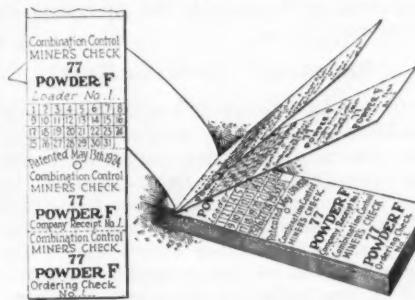
American Institute of Electrical Engineers. Midwinter convention, Feb. 9-13, 1925, 29 West 39th St., New York City. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Ends Disputes About Powder

One source of friction, difficulty and misunderstanding between miner and management at many coal operations is the alleged faulty issuance of powder or other explosive. In the past this in many cases has constituted the root of much unpleasantries, sometimes bordering upon hostility.

In order to forestall all possibility for misunderstanding in this regard Frank Zgol of Sandoval, Ill., has in-



Triple Check and Check Book

One stub is given to the magazine keeper as an order for powder, one is hung on the outside of the miner's tool box to be taken up by the powder-car driver as a receipt and one is retained by the miner. All stubs bear the miner's check number.

vented and patented the system of triplicate checks shown in the accompanying illustration. As may be seen one of the check stubs carries a calendar on which the date when powder is ordered or delivered may be marked. This stub is retained by the miner.

One stub is given to the powder-house keeper and constitutes the order for powder. The third stub is attached to the miner's tool box and is collected by the man who delivers the explosive. It becomes the company's receipt. The driver of the explosives' car will not deliver powder to any tool box unless such a receipt stub is hung on the outside of the box. These triplicate checks can be made up in book form for convenience.

Build Electric Locomotives on Lines of Steam Units

It has often been said that the coal industry in the solution of its great transportation problem might advisedly emulate the example of the railroads in the design of its rolling stock. This unquestionably is in large measure true, for railroad construction today is the outcome of many years of experience. Although the problem of railroad transportation differs radically from that of mine haulage, requiring in many respects a different type of construction, yet their many points of similarity render the adoption of certain details of construction highly advantageous.

With some such idea as this in mind, when the Vulcan Iron Works, of Wilkes-Barre, Pa., some months ago set about designing a line of electric locomotives, it drew liberally upon the experience

gained in its many years of steam-locomotive building. Among the important constructional details that in a measure have been borrowed or adapted from the design of steam locomotives are the bar frames and the three-point suspension of the entire chassis. The brake rigging employed also has been adopted in a large degree from steam practice.

Taking up these constructional features in greater detail, the bar frame is simple in design, easily constructed and amply strong. In these machines each side frame is cast in one piece of steel. While abundantly rigid, such frames permit practically a free circulation of air, thus affording adequate ventilation to the motors and other parts. Furthermore all parts of the machines within the frames may be readily seen and inspected through the openings in these members.

RIDING AND TRACKING EASY

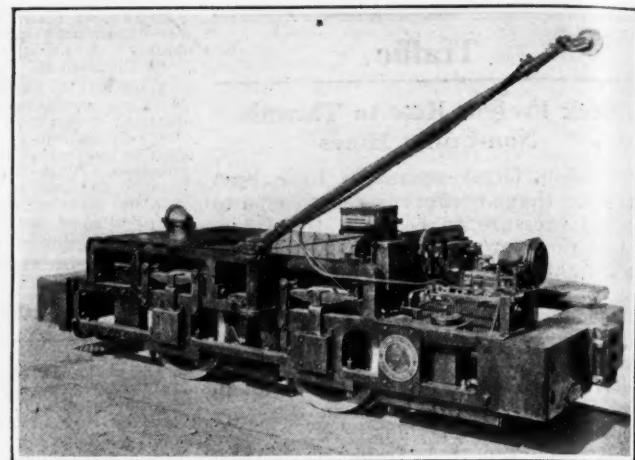
In the past many attempts have been made to equalize the weight carried by the several drivers, but only a mediocre degree of success has been attained. In these locomotives the same principles of design have been followed and as far as possible the same construction has been adopted as has proved so successful in the building of steam machines. The springs are built of semi-elliptic leaves. On the trolley type of locomotive one set of springs supports the frame directly through hangers. One end of the other pair of springs is held by hangers, the opposite ends engaging an equalizing bar extending across the machine supported in the center.

By this means the locomotive is enabled to follow without difficulty any ordinary inequalities in the track. In the storage-battery type of locomotive a similar result is accomplished by connecting the inner ends of the springs by means of a system of equalizing levers, links and bell cranks.

In the trolley type these locomotives are built regularly in 4-, 6-, 8-, 10-, 12- and 15-ton sizes. The storage-battery machines are built regularly in 6-, 8- and 10-ton sizes, the battery making up about one-half this total weight. Any standard battery may be used, either of the lead-acid or nickel-alkali types. Removable battery boxes (so arranged that one battery may be lifted bodily

Trolley-Type Locomotive

This machine has the type of suspension that has proved successful on steam locomotives. The brake rig has also been adapted from steam practice as well as the frames and springs. Bumpers and drawheads may be made of any type to suit the cars to be handled.



from the machine and charged while the locomotive is operating from another battery) are sometimes used.

Usually steel-tired iron-center wheels are used on these locomotives. However, rolled steel wheels or cast-iron wheels with chilled treads may be applied. Bumpers and drawheads may be made of any desired size, shape or height to suit the cars to be hauled. The trolley type of machine is fitted with the ordinary wheel-crank brake. The storage-battery type on the other hand is supplied with a quick-acting, self-locking brake consisting of a lever actuating a cam. Throwing this lever through half a circle applies or releases the brake which is self-locking both in the on- and off-positions.

Either type of these locomotives may be built to any track gage from 30 in. to standard (4 ft. 8½ in.). The wheel base may likewise be varied within reasonable limits, as may also the height.

SINGLE-MOTOR BATTERY LOCOMOTIVE

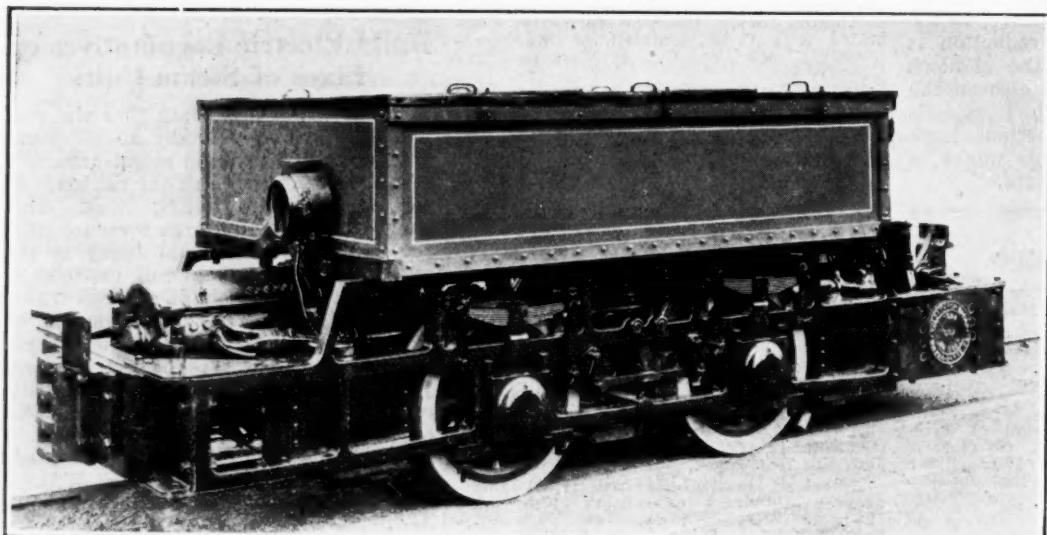
In the storage-battery locomotive only one motor is used, this being mounted at the forward end of the locomotive just in rear of the bumper. By means of a segmented shaft, flexible couplings and worm-gearing, motion is transmitted from this motor to the driver axles, thus utilizing a type of drive the utility of which has been proved in motor vehicles, automobiles, cars, trucks and tractors.

The side frames are planed upon one side and along the upper edge, the dis-

tance pieces spanning the journal openings are mortised into the frames as well as being bolted into place, and the bolts holding these distance pieces in position are not only lock-nutted but are provided with projecting ends so that even when they are upset in hammering out a bolt the thread itself is not injured.

Disconnecting Switch Well Insulated and Protected

An inclosed primary disconnecting switch for use in vaults ahead of the oil circuit breakers on circuits of 4,400 volts and under in capacities from 100 amp. to 400 amp. has been placed on the market by the Line Material Co. of Milwaukee. The box is made of seasoned wood, painted inside and out with two coats of weatherproof paint, has dovetailed joints and is put together with screws. "Transite" barriers are used between switches. The door is hinged on both sides and can be padlocked if desired. A pull stick is mounted on the inside lower end of the door. Brown glazed porcelain bushings at top and bottom of the box provide for the wires, and the flexible contact clips are mounted on wet-process porcelain petticoat insulators which are securely bolted to a channel base, which is in turn bolted to a channel box to channel-wall straps extending each side of the box with holes for attaching to the wall. The box can be closed with the switches open.



Storage-Battery Locomotive

One motor, with shaft parallel with the track, is used on this machine. This transmits its power through a segmented shaft and worm gearing to the axles. Pressure on the journals is equalized through a system of levers and bell-cranks.